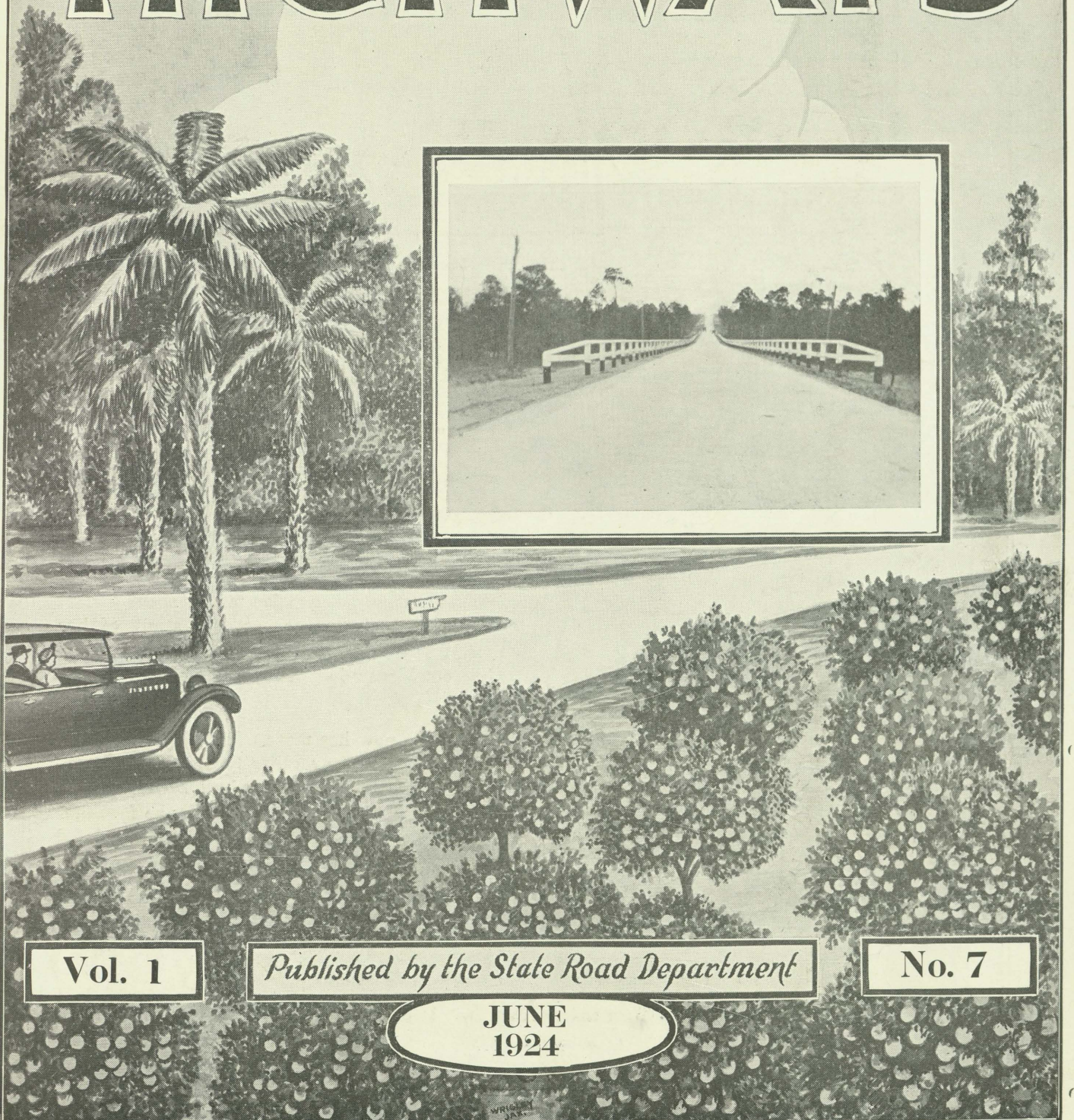


FLORIDA HIGHWAYS



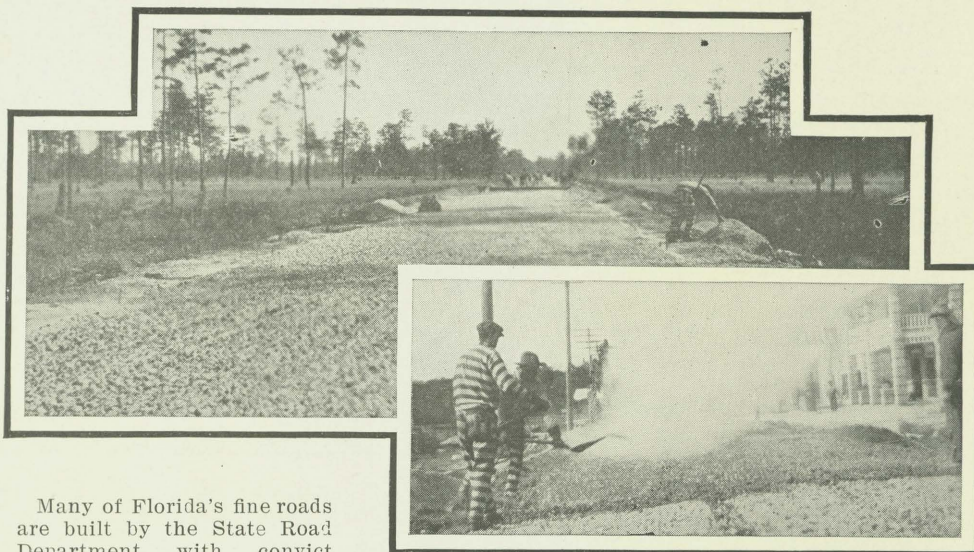
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No. 7

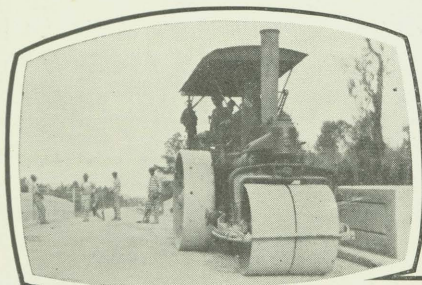
JUNE
1924

For better roads--SLAG



Many of Florida's fine roads are built by the State Road Department with convict forces. Upper photo shows the first step—the Slag spread for penetration; in lower photo the convicts are spreading the chips after first application of asphalt.

Here's how Florida constructs her
Penetration Macadam highways with



FAP No. 32 (10 miles) in Nassau County between Callahan and Jacksonville. Final rolling of the first course and, in lower photo, the finished road after sealing. Another slag built road ready to stand up under the pounding impact of automotive traffic.

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

Florida knows how much good roads can help. She also knows how to build them—to secure utmost mileage for money spent and at minimum maintenance cost. A study of her roads proves another significant fact, namely, her confidence in "Ensley Basic Slag" as a road metal.

Florida now has more miles of hard surface highways than any other State in the Southeast. **And many are Slag built!** Experience, not experiment, is responsible for the fact that twice as many Slag built roads were completed in 1923 as during any previous year—and 1924 promises to even surpass that.

Birmingham Slag Company

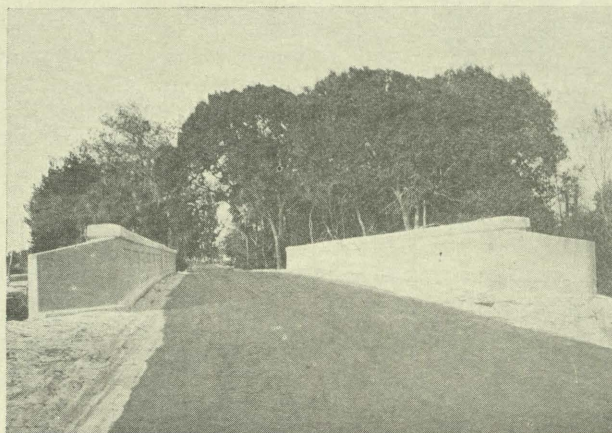
Slag Headquarters for the South

ATLANTA

BIRMINGHAM

THOMASVILLE

FLORIDA HIGHWAYS



Vol. 1

JUNE, 1924

No. 7

Escambia Bay Bridge Celebration

Upwards of ten thousand people gathered at Floridatown in Santa Rosa County on May first to celebrate the commencement of work on the bridge which will span Escambia Bay.

Ideal weather and perfect arrangements made the day a gala one, and the event was regarded as one of the most important in the development of the western section of Florida. Visitors from all over the State were unanimous in the declaration that the committee having the arrangements in charge had performed their duties in a manner which made the entire program move with clock-work precision. Open-hearted hospitality was the order of the day and the free barbecue was supplemented with such an array of tempting viands as to make the feeding of the ten thousand a matter of ease.

The formal program was commenced at eleven o'clock, the Naval Air Station Band from Pensacola furnishing stirring and appealing music. Hon. W. W. Clark of Milton acted as master of ceremonies and first introduced Governor Cary A. Hardee. The Governor, always an eloquent and forceful speaker made what many declare to have been one of the best speeches of his career. Among other things, he said:

"No State in the union has a better or more capable road department than Florida. I appreciate the fact that I am covering considerable territory when I thus refer to the department, however, they deserve these words of commendation from me and

from the people generally. No one unfamiliar with the conditions confronting them when they took hold, or the troublous situations with which they have had to contend, can fully appreciate the great work this department has accomplished.

"When the present department was constituted back in 1921, shortly after my inauguration as governor, they found the department in much confusion and with unpaid bills, and with no money to pay them, to the extent of several hundred thousand dollars. These obligations were discharged as quickly as possible and today their affairs are handled upon a business-like basis. Through their recommendations the finances of the department were re-organized and it has been so handled that obligations have been met with promptness. The tax levy of two mills is fixed in the State millage has been reduced to one mill and the bulk of the revenue now comes from automobile license tags and from gasoline sales. The department has considered, and justly so, that it is sound from an economic standpoint that those agencies which largely use the roads should contribute the major portion of their building and maintenance.

"The department has also definitely fixed the policy of building up through the different sections of the State great trunk-line roads connecting the various sections of the State, as well as joining with the roads from sister states approaching us. The work

(Continued on Page Four)



Florida Highways

Published Monthly
Official Publication of the State Road Department

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H. B. PHILIPS, *Chairman*

W. J. HILLMAN

I. E. SCHILLING

E. P. GREEN

W. M. CORRY

ELLA CREARY THOMPSON, *Secretary*

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L. K. Cannon.....Ass't State Highway Engineer
G. L. Derrick.....Bridge Engineer
C. W. DeGinther.....Ass't Bridge Engineer
Harvey A. Hall.....Testing Engineer
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Joseph Peters.....Supt. of Equipment
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John R. Stewart.....Div. Engr. 2nd Division
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Jewell Smith Jones.....Bookkeeper
C. J. Camp.....Bookkeeper

This magazine is edited in the offices of the State Road Department, Tallahassee, and published monthly. Subscription rate, one dollar per year. Permission is granted to republish, with proper credit, the matter contained herein.

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B. A. Meginniss, Attorney for the Department,
Editor and Business Manager

THE NEW ROAD CONDITION MAP

We are publishing as an insert this month, our road condition map which has been corrected to April first. It is a graphic and accurate representation of road conditions in Florida, that is to say, as regards the State system.

Some of the county roads do not appear on this map. It is practically impossible for the Department to prepare a map which will show every county road. An effort has been made, however, to show every one of the principal roads in the several counties. The primary purpose, however, of the map is to present a fair and accurate picture of the condition of the State Road System.

The tremendous demand which was evidenced in respect to the map which we formerly printed was indicated in the thousands of requests which we had from all over the United States for copies of the map.

It is our belief that this map is proving of inestimable benefit to Florida as a high-class advertisement of the excellent condition of Florida's highways.

THE ESCAMBIA BRIDGE

Elsewhere in this issue there appears an account of the celebration which was held a Floridatown in Santa Rosa County on May first in connection with the commencement of Escambia Bay Bridge. The nature and extent of this celebration furnish ample testimony of the importance of this project as viewed by the people who have the most intimate knowledge of what is planned.

The building of this bridge is one of the largest projects which has ever been undertaken by the Department, and its commencement is the culmination of dreams and plans which have occupied the minds of the Department for years. It has long been known, throughout the State, that Road No. 1, the building of which by the Department, is directed by statute, hinges in large part on the construction of this bridge. When the bridge is constructed, Pensacola and Escambia County will be definitely and finally connected with the mainland.

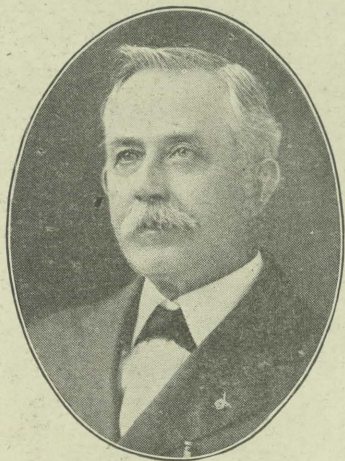
The fact that upwards of ten thousand persons gathered to celebrate the commencement of work on the bridge is the strongest possible indication of the importance with which it is regarded, and this importance is recognized also by the Federal Government which will participate in the construction and which insists upon this road as an interstate highway of importance.

COVER PICTURE

The insert on this month's cover design is a photograph of a stretch on Project 35, Road No. 1, Escambia County. The excellence of the road is apparent from the photograph. It is a plain cement concrete road and has just been opened to traffic. The road lies between Pensacola and the Perdido River.

"If an army depends upon the feet of its soldiers, the nation of the future will depend on its roads."
—Mary Roberts Rinehart.

Chairman's Column



FEDERAL AID IN ITS RELATION TO THE STATE HIGHWAY SYSTEM

Whether the National Government will continue to extend aid to the States for road building is a question that arises with the advent of every new administration. And, too, there continually arises the question as to how this aid shall be extended. The desire of the people for a system of well-constructed roads throughout the country is so strong and so widespread it would seem that there would be no question as to the continuation of Federal Aid to road building. Another consideration which should help to remove all question as to this matter is the general approval of the work of the Bureau of Public Roads which administers the Federal Aid fund and supervises the construction of the roads. No scandal has touched this agency of the National Government. No one has charged that Federal Aid has been wasted in building useless roads. Still, in spite of the good that has been accomplished and the much greater good that we may expect in the future, there seems to be some question as to this matter.

Another question that has arisen and may arise again is as to what policy shall be pursued in selecting the roads upon which Federal Aid is to be applied. Under the existing law, a system of connected highways has been designated in each State which connects with a like system of roads in the adjoining States, constituting what is known as the Federal System. To illustrate, our Road No. 1, extending from Jacksonville to the Alabama line at Nunez Ferry in Escambia County, is in the Federal System. There are a number of roads in the Federal System which extend from Road No. 1 to the Georgia and Alabama lines and each one of these roads connects with a road in the Federal System in the State of Georgia or Alabama, as the case may be, and so on from State to State. Not all the roads in the Federal System lead directly to the State line, but they are all connected so that when completed we will have a connected system of roads over which one may travel throughout the length and breadth of this great land of ours. There are

in the Federal System as now laid out and planned 180,000 miles of road. When we consider the benefits which will accrue to the public by the scientific construction of this great system of connected highways, it would seem that no intelligent man would for a moment entertain a thought as to the discontinuance of the policy of Federal Aid, nor should there be any thought of changing the present policy as to the planning and selection of the roads upon which Federal aid will be applied.

The great need of the present time is a connected system of highways in the States and in the nation, so that one may travel and transport his goods and merchandise from point to point in the State and from point to point in the Nation.

In Florida we are fortunate in that our legislature of 1923 prescribed a system of trunk line roads which should first be built, and this department is now engaged in the construction of these. These roads cover a large part of the Federal System in this State and cover only a few miles which are not the Federal System. It appears, therefore, that our State is working in close co-operation with the National Government to the end that a connected system of highways may be had at the earliest possible time.

Our State has a special interest in the construction of a system of trunk line highways. We need these highways in the State for the use of the people of the State and we need these highways leading to that portion of the country beyond the borders of our State. Any means or way of transportation which will help to bring people to Florida is a matter of vital interest to us. We have a vast area of land waiting for settlement. We are inviting the world to come and help us develop this territory.

The National Government, through its Federal aid policy, is a potent factor in providing one way—the trunk line highway—by which people may reach us.

The moral of all of which is that the people of this State should line up solidly for Federal aid and a trunk line system of roads throughout the State and Nation.

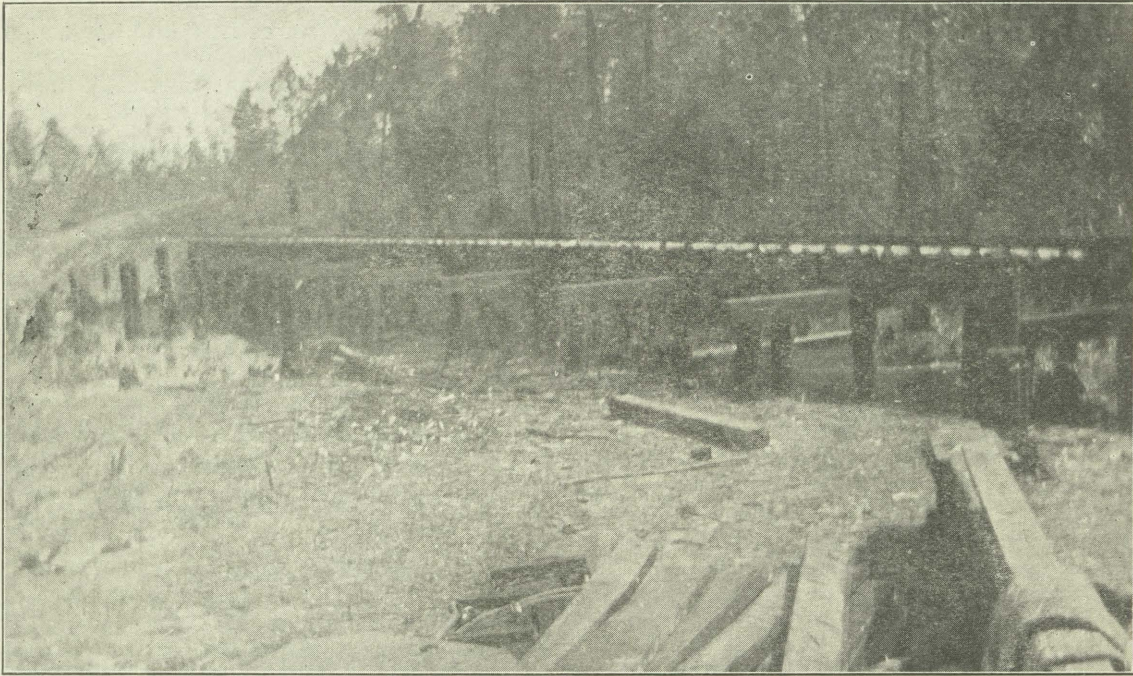
ANOTHER SIDE OF THE DETOUR PROPOSITION

"Of all the signs found on the highways that one marked 'detour' is the most cordially hated."

The foregoing paragraph appeared a few days since in the Florida Times-Union. It is unquestionably true that the detour sign is unpopular—it causes many a motorist to fret. But we are reminded of a story which Major Charles A. Browne, former State Highway Engineer and now Highway Engineer of Orange County, is fond of relating. It is a story that paints the rosy side of the detour picture.

It appears that the Major on one occasion in his county, had under construction a certain piece of road. Physical conditions made it practically impossible to build a satisfactory detour, and as a

Progress on the Escambia Bay Bridge—Federal Aid Project No. 38



Visual Evidence That Work Towards the Spanning of the Bay has Begun

ESCAMBIA BAY BRIDGE CELEBRATION

(Continued from Page One)

has been concentrated largely upon those main roads and the policy, which is a good one and ought to be continued until they are finally finished, is now a part of the law of the land. It was the road department and their far-sightedness that has brought about this policy.

"The department has accomplished wonders in the time they have had hold of the road affairs. When they came into authority very little actual paving and only a few miles of sand-clay roads here and there had been constructed. Fine permanent bridges have been built and are now under construction all over the State and hundreds of miles of roads have likewise been constructed. Whatever may be the future of the road department or its personnel, I trust that certainly no changes will be made in these constructive policies and in the fine character of the work which the department has inaugurated."

The Governor then dealt at length with the great resources and possibilities of Florida and the fact that the eyes of the world are at this time focused upon the State. He made a plea for leadership among men in public offices, for constructive movements to supplant ideas and methods and practices condemned as destructive. In clamoring for destruction, he said, men should be able to suggest something better and to support the executives in carrying out constructive policies.

At the conclusion of Governor Hardee's address, which was enthusiastically applauded, the program was suspended for the barbecue and other bountiful food which had been spread in the beautiful grove which marks the site of the celebration.

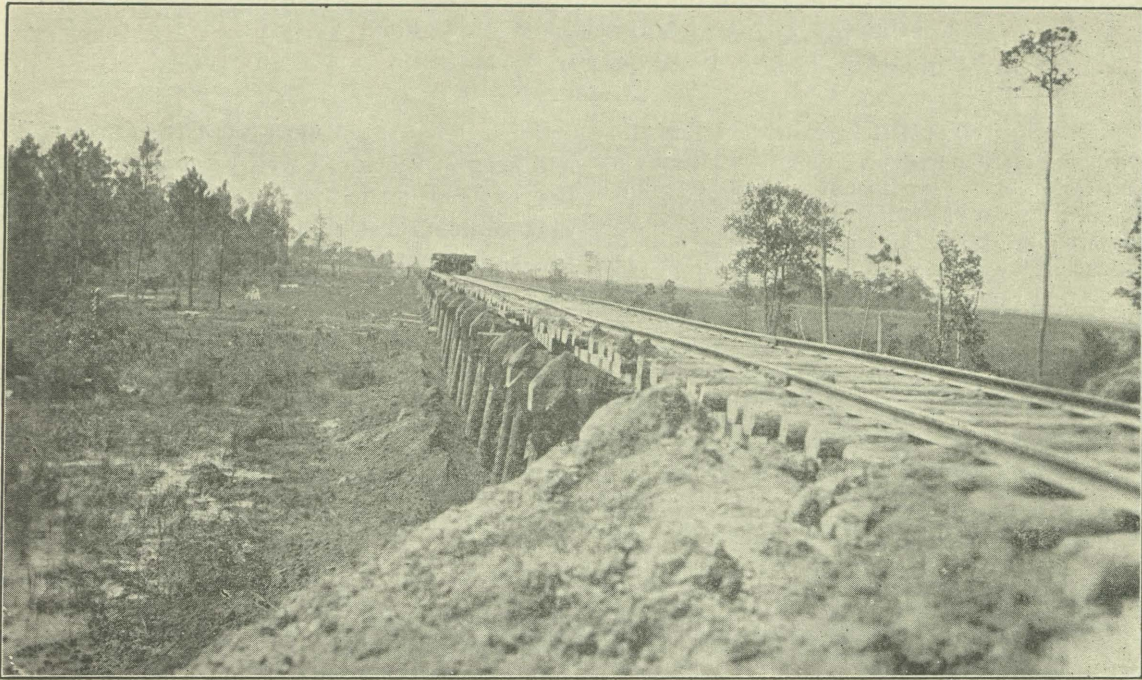
The first speaker after lunch was Senator John

Craft of Mobile, and he in turn was followed by Judge H. B. Philips, chairman of the State Road Department of Florida. Judge Philips called attention to the fact that it was the first time in the history of the State Road Department when all its members had attended a bridge celebration, not only the chairman, but I. E. Schilling of Miami, E. P. Green of Bradentown, Capt. W. J. Hillman of Live Oak, and W. M. Corry of Quincy, members, and J. L. Cresap, state Highway engineer, being present. Judge Philips declared that the entire membership of the department is interested in the building of that bridge and that they will see that it is completed. He called attention to the fact that there is no sectionalism in the department, and that he could count as strongly upon the members from the southern portion of the State in furthering the roads program in northern Florida as he could upon any other member or members and that the same applied to every section of the State; that the department is bending every effort to accomplish the completion of a State system of roads without partiality to any section or community. He reminded his hearers that the building of the Escambia Bay Bridge has always been one of his pet projects and that he was happy to see the fruition of one of his fondest dreams in the commencement of work on the bridge.

Hon. William Fisher of Pensacola followed and declared that the Governor had robbed him of all his thunder in his talk on the good roads movement and on the splendid work accomplished by the department. During the course of his remarks he declared that the structure soon to be reared across the bay ought to be christened "Philips Bridge."

Hon. W. M. Corry, member of the department from the third Congressional District, was the final

Another View of the Escambia Bay Project



This gives an idea of the succession of Fills and Bridges which constitute the present Contract

speaker and spoke briefly in his usual felicitous manner. He expressed the sincere thanks of all the visitors for all the courtesies and hospitality extended and declared that every one would be back when the bridge is finally opened to traffic.

The celebration was sponsored by Santa Rosa and Escambia Counties, L. W. Hardy of Escambia County being chairman of the general committee on

arrangements, and J. E. Keen, Santa Rosa chairman. Florida Highways takes this opportunity on behalf of the State Road Department to express to the people of Escambia and Santa Rosa Counties the sincere and hearty thanks of every member of the party for the generous hospitality and many courtesies showered upon them during their stay in Santa Rosa County.

ROAD BRIEFS

St. Petersburg plans to build a network of roads on the peninsula south of the city. It is only a question of time when a boulevard will follow the water-line of the peninsula for its entire length, while many highways will form cross-country connecting links.—Clearwater Sun.

W. L. Polk, foreman of the State Road Department in Osceola County, was a visitor here Tuesday. He has a force of thirty men and two trucks building a thirty-foot roadbed through Reedy Creek swamp, which, when completed, will be one of the best roads in the entire State. It will be a rock bed with six inches of crushed rock with a penetration finish of two inches of wearing surface and will be sixteen feet wide. The foundation for the road through this swamp is being raised and widened and there will be no interruption of traffic during the repairing, as an 800-foot bridge detour is already constructed and in place, and this will be moved as the work progresses.—Kissimmee Valley Gazette.

By the middle of November at the latest—perhaps by the end of August—State Road No. 5 between Punta Gorda and Fort Myers will be completed as

a first-class hard-surfaced highway. This was made certain when the county commissioners of Charlotte County, in session Tuesday afternoon, awarded the contract for hard-surfacing Charlotte County's portion of this road to Boone & Wester, the contractors who built the splendid grade and set a record for Florida in this class of construction. Lee County's portion of the road has been hard-surfaced for several weeks. Work on the Charlotte County contract will begin at once, the contractors stating that they would not wait for the contract to be returned before beginning operations.—Punta Gorda Herald.

The Dixie Highway between Wauchula and Bowling Green which has been closed to traffic for the past two weeks in order to give it a surface treatment of oil, is now open to travel. This is one of the roads leading into Wauchula that has undergone severe criticism in the past because of its bad condition, but within the past year the road has been shouldered and ditched and put in fine condition, the surface treatment of oil which has just been laid completing the work and making it one of the easiest roads to travel between here and Tampa.—Wauchula Advocate.

Florida Rides to National Front on Improved Roads

Chicago Highway Official Tells State Road Story

By WILLIAM G. EDENS, Dixie Highway Commissioner, in Chicago Tribune.

To have a cordial reception in Florida cities and towns is a common experience, but to be taken for a thousand mile motor trip to observe the development of that State is rather an unusual one. This experience was mine during recent weeks, due to my identification with the Illinois Highway Improvement Association and the Dixie highway. The trip was made in connection with the Tamiami Trail Association motorecade.

Starting at Tampa, we proceeded down the west coast to Fort Myers, from there to Lake Okeechobee, which was crossed by boat, then to Miami, and from Miami up the east coast on the Dixie highway to Jacksonville. The Tamiami trail takes its name from the cities of Tampa and Miami, and is one of the most notable public improvement efforts now under way in the United States, being of especial importance on account of the fact that it is the chief highway project in what promises to become, and is already fast becoming, the chief winter resort in the eastern section of our country.

The plan of the Tamiami trail, as its Florida promoters and enthusiasts have it in mind, is to develop in conjunction with the Dixie highway a transportation loop around the State, connecting all important communities near the coasts and intersecting all highways from interior points, thereby putting each part of the commonwealth in close and constant connection with every other part. How intelligently and how earnestly this plan is being carried out those of us who were so fortunate as to be the guests of the association during the great inspection trip of ten days ago had good opportunity to observe. If this loop is made all the way with good paving material, as I believe it eventually, and, indeed very shortly, will be, Florida will have one of the most serviceable highway systems in the United States.

Two weeks were devoted to the trip down one side of the State and up the other, and the program was carried out without a hitch under the direction of Ora E. Chapin, executive vice president of the association. Meetings were held at nearly all of the cities and towns through which the cavalcade passed, and there were many community gatherings in the nature of dinners and dances, one a Seminole Indian corn dance, characteristic of the hearty hospitality of the southern part of our country.

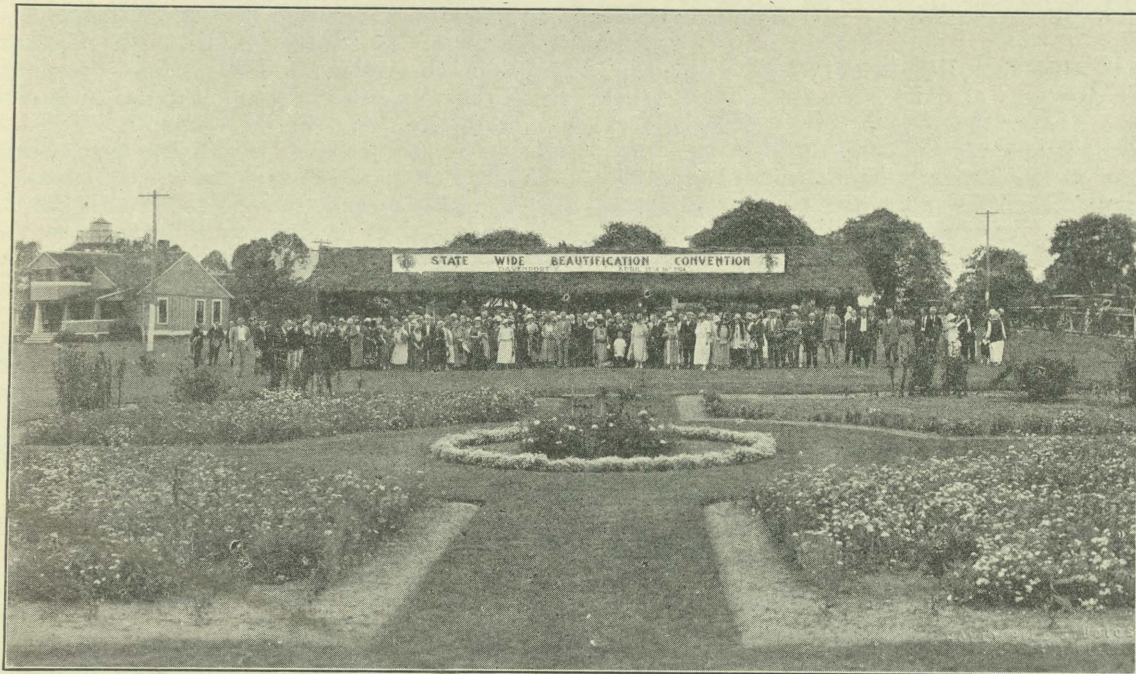
Since it had been more than thirty years since I had been in Florida, I was, of course amazed at the improvement made and the activity of the people of that State in hastening to make the most of the great possibilities of the climate and soil. If my observations led me to make any suggestion as to the direction in which the power of that community activity should be exerted, it was in the form of a warning to construct highways of durable material in view of the hard use they are sure to have as soon as they are made smooth and passable. Florida should be satisfied with nothing less than the system of concrete roads projected by the people of Illinois and partly built under the plans adopted and put into execution during the administration of Gov. Lowden.

When it is kept in mind that Florida has increased in population more rapidly in the last ten years than any other Southern State and that this increase refers to the permanent rather than to the transient population, it will be seen that there must be reasons why people go to the State and stay there. Inquiry and observation on the part of the visitor will convince him that only a small part of this immigration from other parts of the Union is due to the fact that one can go fishing, surf bathing, or picking strawberries during the month of January in Florida, something he cannot do with comfort in any other part of the continental possessions of Uncle Sam. In order to understand in any adequate degree the attractions of the State it must be recalled that crops of all sorts, live stock, truck, fruit, dairy, and poultry products have increased so rapidly that the exchange of products between the Floridians and the rest of the country has become so great and constant in volume that a railroad carload of products crosses the State line on the average every four minutes. With more seacoast than any other State in the Union, Florida has not only delightfully pleasant breezes and pure air, with sea food in abundance, but has access by water to the markets of the whole world. With the eventual completion of thousands of miles of concrete roads and a highway system that will make the entire State one community socially and industrially, the rail and water communications to other States and other countries will have a still greater use than they have at present.

DADE COUNTY WILL VOTE ON IMPROVEMENT BONDS OF OVER \$2,127,000

Miami, Fla.—Tentative plans have been adopted by the Dade County Board of Commissioners for improvement projects estimated to cost \$2,127,743 in the aggregate, for which a bond election will be held at an early date. The largest item among these projects is that of widening causeway viaducts, for which \$600,000 will be asked. Others include the following:

For matching Federal Aid appropriation and acquiring right-of-way for new Dixie highway, \$300,000; completing Tamiami Trail and widening southeast Eighth street, \$400,000; West Dixie highway, \$225,000; canal highway, \$39,193; Everglades avenue, \$20,800; Red road and bridge, \$30,250; West Flagler street extension and bridge, \$52,500; roads in district No. 4, \$80,000; roads in district No. 5, \$100,000; North Miami avenue extension, \$50,000; fair grounds, \$100,000; armory, \$100,000, and for Snapper Creek bridge, \$30,000.—Manufacturers Record.



Highway Beautification Conference Attended By More Than 300 Delegates

Fourteen Counties of the State Take Part

With more than three hundred delegates from fourteen counties, Florida's second convention on beautification met in Davenport April 15. The Hollyhill Grove and Fruit Company provided a beautiful arbor in Wilson Park as a meeting place so that delegates might be surrounded on all sides by flowers. The arbor was thatched with palmetto and splendidly decorated with a profusion of red hibiscus, white pinks and gladiolas. The following counties were represented by large delegations: Broward, Duval, Volusia, Hillsborough, Manatee, Lee, Osceola, Highlands, Lake, DeSoto, Citrus, Pasco, Seminole, Orange and Polk. The Hillsborough county commissioners attended the convention in a body and upon their invitation the convention voted to hold its fall meeting in Tampa.

The program was held under the auspices of the State Beautification Committee of the Florida Development Board of the State Chamber of Commerce, which committee consists of Chairman Karl Lehman, Orlando; Mrs. A. G. Cummer, Jacksonville; Mrs. Joseph Remington Ellicott, Ormond Beach; H. Harold Hume, Jacksonville; Carl C. McClure, Fort Myers; Willis B. Powell, Tavares; Mrs. H. Pryor, Haines City; and Mrs. A. B. Whitman, Orlando.

Convention Singing Feature

Convention singing was a feature of the day, Mrs. A. A. Coult serving as pianist, Draper Bartlett and S. Kendrick Guernsey, Orlando, acting as song leaders.

The invocation was pronounced by O. A. Smith, Haines City.

The convention was welcomed to the city of Davenport by Mayor W. Paul Henry, who told of the elaborate plans and the hearty welcome from this community.

Dr. Hiram Byrd of Bradentown responded on behalf of the convention expressing surprise and delight at the growth and beauty of Davenport.

Secretary A. A. Coult of the Florida Development Board outlined the policy of the Development Board in fostering and encouraging every worth while movement for the interest and advantage of the State as a whole and called attention to the place of leadership that has been won by Florida in the work of beautification, gardens, clubs and similar activities.

Mrs. A. B. Whitman of Orlando spoke of the importance of thorough organization which should enlist every community and every civic organization in a general county wide beautification commission, outlining the form of organization that is in use in many of the counties of Florida.

The beautification committee is prepared to furnish conventions and organization instructions to any county interested in this work.

The matter of financing beautification work brought forth the suggestion that the county commissioners in some counties make an appropriation for this work and this is supplemented by memberships and subscriptions from individuals and busi-

ness firms. County commissioners are assuming a large responsibility for putting the road sides in condition for proper planting and the maintenance of this work when done.

100-Foot Rights of Way

Karl C. McClure of Fort Myers emphasized the importance of securing one hundred-foot right of ways for all important roads and told of the work being done on the Tamiami Trail, where broad visioned county commissioners are making preparations for future years in setting aside this width of highway and arranging for the beautification of the Tamiami Trail from High Springs to Miami.

H. Harold Hume told of the accomplishments in Duval County, where the county commissioners have established a one hundred-foot right of way on the road leading to the beaches and on the road from Savannah to Jacksonville.

The consensus of opinion expressed in the discussion is that the ideal toward which to work in Florida is a one hundred-foot right of way.

Major Charles A. Browne, engineer of highway construction in Orange County, outlined practical ways of building modern and sufficient roads without destroying the natural beauty in fine trees, by slightly changing a road often a choice bit of scenery can be preserved and where a nine-foot road is widened to sixteen feet you are able to save fine trees by building a two-way road with the trees between and he outlined how this has been done in several instances in the road building in Orange County.

In this connection surprising and interesting announcements were made of large tracts of land which have been donated for park purposes in Florida. The donors were praised and others urged to emulate their spirit of generosity. The Florida Development Board is compiling a complete list and will soon give out to the press this very valuable information.

Afternoon Session

At the opening of the afternoon session the convention was favored with singing by the boys and girls of the public school of Davenport, using songs of citizenship and optimism. The convention applauded heartily the splendid singing of the children.

A message from Roger W. Babson was brought to the convention by Mayor Henry of Davenport, in which he expressed his regret at his inability to attend the convention and assured the committee that he would attend and address the next convention provided it met in a city that did not have a sign on the highways for at least five miles in any direction. Tampa accepted the challenge.

Swat the sign and save the scenery was the keynote of a characteristic and enthusiastic speech by Willis B. Powell, secretary of the Lake County Chamber of Commerce in which he told of the effective work being done in that county along the lines of beautification, from 1919 to the present day, and announced that Mr. C. L. Stokeley of Mount Dora and Winter Haven would present quantities of banana plants for the use of the beautification commission on such highways where the cattle have been fenced. Mr. Powell's address provoked much spirited and interesting discussion which showed conclusively that the sentiment of Florida is solidly against the use of signs on the highways, except

those placed by authority of the county commissioners.

Mrs. Joseph Remington Ellicott of Ormond Beach, chairman of the National Billboard Committee, spoke of the splendid nation-wide campaign in which the women's clubs are leading, to banish the billboard. By this plan, the women are writing personal letters to national advertisers, suggesting that billboards on the highways are objectionable; that they spoil the scenery that belongs to all the people, and asking their co-operation in the program of eliminating billboard advertising. The committee has met unusual encouragement. Many national advertisers have written that they will discontinue this type of advertising. Many other plans were suggested which would assist in banishing the billboard.

Road Marking Discussed

Adequate road marking was discussed as a next step after objectionable signs had been removed. One of the excuses sometimes given by people who desire to put their advertising on the roads is that these signs are needed to guide travelers. The splendid plan of Orange County superintendent of roads and bridges, A. L. Wright, was outlined and demonstrated by samples of this method of marking. By this plan, every fourth telephone pole has a neat outline of the State of Florida some twelve inches square, with a star on the outline showing the location of that highway and a figure indicating the number. That is, State Highway No. 2 is indicated by a figure "2." All other roads are marked accordingly. At each crossroads or turn there is a neat, attractive marker giving direction and mileage. The signs are placed by and at the expense of the county commissioners, as provided in the laws of the State of Florida. It was urged that all counties co-operate in a general plan to mark the roads officially through their county commissioners.

The need for city and county planning was emphasized in a talk by W. A. Cook, Oneco, in which he urged a program toward which we could work in a systematic way. The discussion from the floor showed the importance of each county securing competent professional advice in its landscape plans.

When bond issues are voted for the building of highways in the State, provision should be made for the beautification of those highways.

James E. Hendry of Fort Myers suggested that a comparative cost of highway construction and beautification would be \$12,000 per mile for the building of the road and \$300 per mile for beautification. This work should be provided for in the bond issue as well as the cost of construction.

One of the most interesting discussions of the convention was led by Mrs. Jack H. Pryor of Haines City, on the importance and practicability of interesting children in this whole question. Many examples were cited by Mrs. Pryor and others on the floor of the convention of the excellent work that had been done in interesting school children in the beautifying of school grounds, their home places and the highways.

Garden Club Address

Mrs. A. G. Cummer of Jacksonville gave an interesting address on the splendid work being done by garden clubs. She called attention to the fact that there were only four of these organizations in the State and there should be many others; that Florida

could be made literally a land of flowers through a larger activity in garden clubs.

Miss Grace Edwards of Winter Park spoke on the value and importance of flower shows stimulating an interest in the growth of flowers and beautification of home places.

The afternoon session closed with a bright and interesting talk by Frank Whitman of the Florida Grower on some improved highways in Florida. It proved to be a fitting climax to an interesting afternoon.

Grosvenor Dawe of Tallahassee gave the convention an interesting message on the subject of centennial beautification, in which he suggested that this centennial year, when the East and West Coasts of Florida were united to form this great State, could be appropriately celebrated in a great plan for state-wide beautification.

John L. Cobbs, director of public relations, Atlantic Coast Line Railroad of Wilmington, N. C., gave a message to the convention on railroad property beautification and illustrating this with photographs of work done along the lines of this road.

The feature of the closing session was a splendid illustrated address by H. Harold Hume of Jacksonville, in which he showed by means of stereopticon something of the wonderful work that has already been accomplished and is yet to be done in Florida. He emphasized the value of saving the natural groves along the railroads and importance of what we already have, as well as supplementing this with proper plantings of such flowers and shrubs as will do best in this climate and under our conditions. He told of the wonderful work accomplished by the Jacksonville Civitan Club on the highway of the Jacksonville-Lake City road.

A bill to prohibit signs and regulate bill boards in Florida will be presented to the next legislature.

The convention discussed the bills passed in such States as Massachusetts, Minnesota, New York and Pennsylvania and a committee is shaping up a similar bill for this State which will be the beginning of a most effective method of curbing this evil in Florida.

The convention went on record in a hearty vote of approval of the Tamiami Trail Association in their stand for the one hundred-foot right of way and the beautification of this road, commending the action to road enthusiasts everywhere.

Vote for Hillsborough

A vote of appreciation was extended to the Hillsborough county commissioners and engineer for their presence in a body at this convention, the inspiration it gave the gathering, and delegates were urged to invite their commissioners to attend the next convention, following the splendid example set by Hillsborough.

The convention heard, with great disfavor, the report that the wonderful trees between Daytona and New Smyrna had recently been ruthlessly destroyed by development companies and expressed itself in no uncertain terms against this wanton destruction of one of Florida's greatest assets. The convention voted a protest against those responsible for this destruction and urged developers in all parts of the State to do their utmost in preserving the fine trees and natural beauty of Florida.

Lorenzo A. Wilson of Jacksonville and Davenport was called to the platform and the convention rose in enthusiastic appreciation of the generous provision made for the convention under his leadership at Davenport and thanked him for his continued interest in all that makes for the welfare of Florida.

The great success of the Davenport convention and the growing interest in this subject in Florida

(Continued on Page 23)



The Arbor, Surrounded with Flowers, in which the Convention was held

Roads in Territorial Florida

One of the most interesting contributions which has reached Florida Highways is presented herewith and was obtained through the courtesy of Mr. J. C. Yonge of Pensacola, and comes from the valuable historical collection which has been made by that gentleman and his father, Hon. P. K. Yonge.

It is interesting to observe that even in the early days of Florida the question of developing roads was regarded as of tremendous importance and a comparison of the steps taken to accomplish the meager results obtained with the elaborate system now being carried out in the State is illuminating. In fact, Federal aid was extended to Florida roads one hundred years ago.

The article follows:

Florida Roads

(Written in 1837 by John Lee Williams, who was one of the two commissioners appointed to select the site in Middle Florida for the capital.)

"When Florida was ceded to the United States there was but one road of any consequence in the Territory. That, called the King's Road, extended from St. Augustine to the River St. Marys. It had been well constructed by the English, and at first extended to New Smyrna, but the lower part was wholly grown up, and the balance much out of repair. Trails leading from Pensacola to Mobile, and up the Escambia, were scarcely passable for carts. In 1824 twenty-five thousand dollars were appropriated for a public road, to be opened from Pensacola to St. Augustine. Unfortunately for the Territory, it was located through a wilderness part of

the country, a great proportion of which has never been inhabited, and the road in those parts has never been used. Another appropriation was made for a road from Jacksonville to Tampa Bay; this was well constructed, and has proved a useful route. In 1828 the King's Road was reopened as far as Tomoko, forty miles south of St. Augustine, and to about ten miles north of Jacksonville. It has lately been opened to New Smyrna.

"Attempts were made to open roads as far as Charlotte Harbor on the west, and Cape Florida on the east side of the peninsular; but the face of the country was found to be covered with extensive swamps, and it was thought that the expense of constructing roads could not be justified by any advantages likely to accrue.

"A great variety of public roads have within the last three years been constructed by the several counties of the Territory; so that in general communications from one part to another are much more convenient than formerly. In 1830 Congress granted an appropriation of two thousand dollars for repairing the road between St. Augustine and Tallahassee; also two thousand for opening a road between Marianna and the mouth of the Apalachicola River; also a large sum for constructing a road between Pensacola and Blakely. In 1835 seven thousand dollars were appropriated to repair the road between Pensacola and St. Augustine. Part of this sum was expended in repairing the road from Bayard on the St. Johns to Newnansville, when the Indian hostilities put a stop to the work."

WHAT OLD CAESAR DID!

When Caesar took a westward ride
And grabbed the Gauls for Rome,
What was the first thing that he did
To make them feel at home?
Did he increase the people's loads,
And liberty forbid?
No; he dug in and built good roads—
That's what old Caesar did.

Did Caesar put the iron heel
Upon the foemen's breast,
Or did he try to make them feel
That Rome rule was the best?
What did he do to make them glad
As he came their lands amid?
He built good roads, in place of bad,
That's what old Caesar did.

He built good roads from hill to hill,
Good roads from vale to vale;
He ran a good roads movement
Till Rome got all the kale;
He told the folks to buy at home,
Built roads their ruts to rid,
Until all roads led up to Rome—
That's what old Caesar did.

If any town would make itself
The center of the map,
Where folks will come and settle down
And live in Plenty's lap;
If any town its own abodes
Of poverty would rid,
Let it go out and build good roads—
Just like old Caesar did!

—Author Unknown.

COOPERATING WITH THE PUBLIC

In his instructions to his field forces, John D. Williams, State Highway Director of Indiana, includes this admonition:

"While we must do our work on the highways it is necessary that we inconvenience the users of the highways just as little as possible. You must give a traveler the right-of-way. You must consider yourself as exercising a kind of a fatherly protection over the traveling public and respect their rights in every reasonable way as the roads are for their use. A truck driver who refuses to permit an auto coming up from the rear, to go by him, commits an offense against the law as well as one against the rules of the department, and is subject to prompt dismissal."

Lighting the Hudson River Vehicular Tunnel

One of the most ambitious engineering projects attempted in recent years is the building of the Hudson river vehicular tunnel, which will link New York to New Jersey in the most efficient way yet devised. Traffic between the two States is at all times very heavy, and because of New Jersey's popular resorts, week-ends and holidays bring a congestion of automobiles that is far beyond the capacity of the existing ferry service.

There will actually be two tunnels, one for east-bound and one for west-bound traffic. Each will be 29 feet 6 inches in diameter, and 9,250 feet long. The roadways will be 20 feet wide and will have an overhead clearance of 13 feet 6 inches. The rest of the space will be required for the ventilating system, which will consist of air ducts at the top and bottom of each tunnel. Fresh air under compression will be forced into the lower duct and from there into the roadway itself through air flues and expansion chambers placed at intervals of 15 feet along each side of the tunnel. This will force the vitiated air out through openings also at 15 foot intervals into the top duct, whence it will be drawn out by large fans and discharged through the caissons at the ends of the tunnels.

The tunnels are being constructed from both ends, and will meet somewhere in the middle of the river. The calculations on the work are so accurate that when the tunnels meet they will not deviate half an inch. The tunnels are built in ring sections of fourteen cast-iron plates, each plate weighing a ton and a half. The excavating is done in shields, or movable heads, which are pushed forward $2\frac{1}{2}$ feet at a time by 30 hydraulic jacks. As the shield moves forward the rings are added one by one. When completed the tunnels will have a protective covering of broken stone, and at each entrance there will be a modern pier above the tunnel as it reaches the land, in order to avoid the possibility of a ship running into the tunnel where it comes up.

One of the most difficult problems in connection with building the tunnels has been proper illumination. The Illuminating Engineering Laboratory of the Westinghouse Lamp Company recently became interested in this problem and began a series of ex-

periments to determine the best possible lighting system. In order to study all suitable systems of illumination under approximate operating conditions, an exact model of the tunnel on a scale of 1 inch to 1 foot and 10 feet long was constructed in the Bloomfield plant. Exact replicas of the proposed lighting units were installed in this model tunnel, furnishing an amount of light corresponding accurately to the desired illumination. The model tunnel is complete to the most minute detail, even the brass railing along the walk for pedestrians being provided.

It would seem at first glance that lighting the tunnels would be merely a matter of installing plenty of units, but that is not the case. It is necessary in the first place to eliminate all glare, so the units, 1 every 20 feet, were encased in metal boxes sunk into the concrete of the tunnel, and diffusing glass used to cover them. Next, the lights had to be so placed as to secure the greatest possible amount of reflected illumination from the walls and ceiling. Third, and most important, it is extremely necessary that all shadows between cars be eliminated in so far as possible, as sharp shadows would cause drivers to misjudge distances, which might result in accidents. As the new tunnel is expected to relieve the traffic congestion on the west side of New York, any accidents or tieups in the tunnel must be rigorously guarded against, and proper illumination will be an important factor in accomplishing this.

While the experiments on the illumination were being made, the model tunnel was shown to C. M. Holland, chief engineer of the New York-New Jersey Bridge and Tunnel Commission. Mr. Holland was very much interested in the model, and at his request it was put on display in the offices of the tunnel commission. While there it was seen by some of the New Jersey senators, and at their request was shipped to Trenton, N. J., where it was exhibited for about two weeks in the rotunda of the State capitol. During this time it was studied and commented upon very favorably by the entire legislature and by thousands of visitors.—Municipal and County Engineering.

ADVANTAGE OF IMPROVED ROADS

The following is an extract from a letter sent by R. E. Johnson, dealer in cotton, guano and farm products, of Gaffney, S. C., to a member of the General Assembly from Cherokee County, and published in *The State*:

"I have often said that I would gladly pay \$100 per year road tax if the State and county would spend the money on permanent roads.

"As my farm and your farm are on the same road, I want to give you some figures on the cost of hauling over this road in 1913 and in 1924. In 1913 it took my teams one-half day to get to Gaffney, ten miles, over a road hub deep in mud. We put five sacks or 1,000 pounds on the wagon with two 1,100-pound mules, got an early start after dinner, with two tired mules for the return trip home and could go about a quarter of a mile and have to stop and wind the mules; had to keep this up all the way and

they reached the farm at night with the mules and driver completely worn out—at a cost of \$4.00 per 1,000 pounds, not figuring the cost or damage done the mules and wagon; 80 cents per ton mile.

"Last week my wagons came to town in two hours in a trot, put on 20 sacks or 4,000 pounds to the wagon with 900-pound mules and all were back home by dinner time and hadn't even raised the sweat on the mules. At \$4.00 per day it cost me \$1.00 per ton to haul my guano this year against \$8.00 per ton in 1913. Why couldn't I afford to pay \$100.00 per year road tax?

"I have spent three hours in the rainy season in 1913 on this road in my auto running in low gear and pushing out of the mud holes, damaging my car \$25.00 per trip, when now it takes me from 20 to 30 minutes, rain or shine, to make the trip and my car lasts four times as long and looks new five times as long as it would back in 1913."

Some Highway Fallacies

One of the factors retarding road development is lack of appreciation of the modern science of highway building and using.

We know too many things about roads which are not so!

Many of our highway ideas are 20 years behind the times. We haven't caught up with the engineer.

For instance, "all roads wear out. The enormous money invested in them is thus a capital loss."

Roads do not wear out. The surface of a good road wears, of course. So does the roof of a house. But replacing the house roof doesn't mean that the rest of the house isn't good. The surface of a road is its roof. If it wears out it must be replaced. But that doesn't mean that the right of way, the grade, foundation, and all the material is any less valuable than at first.

"Trucks destroy roads. Therefore trucks should pay for roads." That, too, is a fallacy. A truck no more destroys a road, when truck and road fit, than a baby carriage destroys a garden path. It is lack of maintenance which destroys roads, it is allowing too light a road to be built for the traffic it will bear, which destroys roads; it is failure to enact wide tire and maximum load laws which destroys roads.

"There isn't money enough to pay for national highways. We will all be bankrupt!" More fallacy. There are fourteen million motor cars in the United States. If they are worth on an average of \$500 each (which is an underestimate), they represent an investment of \$7,000,000,000. Did we get bankrupt buying them? We did not! Why should we get bankrupt buying seven billion dollars worth of roads * * * and the interest on seven billions will build today more national highways than we have as yet engineers and machinery to build.

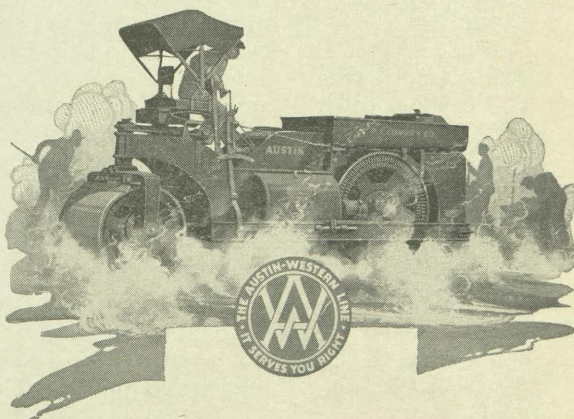
Transportation has been, for us Americans, nothing but rail and water for all our history. Now we are compelled to translate the word into "highways" and "motors." Motors we understand * * * highways, as yet, we only partially comprehend, and "motor transport," as a whole, is yet a sealed book to most of us.

The first step in opening it is to get rid of fallacious thinking—to realize that what used to be, is no more true today, than what is proper road width and cost today, will fit conditions fifty, a hundred years hence.—Exchange.

"HOT STUFF"

A rush job on one of the World's busiest thoroughfares—Chicago's famous Michigan Boulevard—a job calling for work of the finest kind, done in the shortest possible time. The R. F. Conway Company landed it, and this Austin Motor Tandem Roller of theirs played no small part in completing it on schedule.

"Hot stuff" puts a tandem roller to the severest test, and that is where the motor driven Austin shines the brightest in comparison with those of the steam driven type. Check over a few of the features that have made Austins such lasting sources of satisfaction and profit to the Conway Company and many others among our more exacting paving contractors, and the answer is plain: No time lost getting up steam and taking on coal and water; no falling coals to injure the pavement; steadier running because of the low center of gravity; and easier steering and handling.



WHY TAKE LESS IN A TANDEM?

The Austin-Western Road Machinery Company

Factories and Home Office, Chicago, Illinois

GEORGIA BRANCH

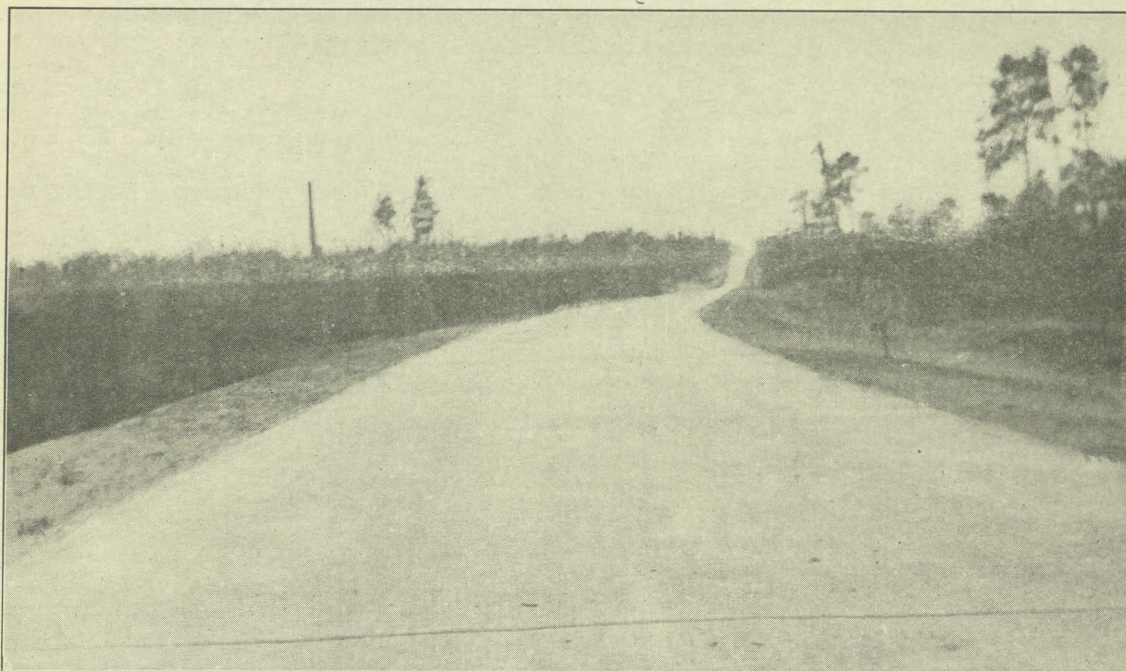
115 Marietta Street, ATLANTA, GA.

Northern and Southwestern Florida Representative

ROSCOE KENT,
Orlando, Fla.

East Coast Representative,

L. D. LLEWELLYN, Suite 214, Bedford Bldg.,
Miami, Fla.



Federal Aid Project 35, Escambia County; Concrete Pavement Superelevated on Curve. Note shoulder on high side not dropped but carried out as high as pavement

A REAL TRIUMPH

Aestheticism dealt a solar plexus blow at commercial initiative when the Standard Oil Company, one of the largest users of outdoor advertising display, last month voluntarily removed more than 1,200 signboards located along the principal highways in Washington, Oregon and California.

What shall it profit us to build highways through regions of scenic charm only to have the vista of the traveler cut off and assailed by hideous wayside bulletins exploiting the merits of this commodity or that, road builders have reasoned, but efforts to eradicate the nuisance have been unsuccessful due to the fact that the signboards have been erected on private property, over which public officials have no jurisdiction.

The action of the Standard Oil Company is a most laudable one. Aside from the disfiguration of an otherwise beautiful landscape, the establishment of billboards has created a menace to traffic owing to the tendency they have to draw the attention of motor vehicle operators from the road. The atavistic instinct for brilliant colors continues to evidence itself in mankind and the garish chromatic displays situated along the highways will attract the eye of the most complacent driver, with potentially dangerous possibilities.

The psychological effect of billboard advertising is not a good one. If the gentry who direct the exploitation campaigns of purveyors of the sundry and divers commodities thrust upon the public by signboard would reflect on the reaction brought about by the bulletin urging "Those Who Know Quality" to "Use Park's Pastiles for Pea Soup" that smacks the motorist in the face just when he anticipates a charming prospect, he would realize that whatever

possibility Brother Park had to add another customer has been totally dissipated by the choleric anathema the traveller hurls at the offending obstruction.—Western Highways Builder.

FIRST "SHIRT SLEEVE" ROAD SHOW TO BE HELD IN NORTH CAROLINA IN JUNE

The first open-air demonstration of road building methods and machinery will take place in North Carolina June 4, 5, 6 and 7. The American Road Builders' Association has accepted the invitation of the North Carolina State Highway Commission to participate in a "shirt sleeve road show," as it has been christened.

The Pan-American Highway Commission, consisting of a group of about 40 leaders in the highway movement in the various countries of South and Central America, will be in North Carolina at that time and will visit the shirt sleeve show, as a part of their study of highway conditions in the United States.

Hitherto, exhibits of road building machinery in the United States have been held indoors where it was impossible to see the machinery actually at work. For this reason the North Carolina show will be of unusual interest.—Highway Engineer and Contractor.

Some of the best repartee in the world occurs to the driver a couple of hours after his argument with the traffic cop.—Ohio Motorist.

"The six wheel automobile is coming," says a motor expert. The average pedestrian is apathetic. By the time the two front wheels have passed over him he is past caring how many more there are.—London Opinion.

Transactions of the State Road Department at its Quarterly Meeting

The second quarterly meeting of the Department was held at the offices of the Department at Tallahassee, on April 28th and 29th, with all members present.

J. L. Cresap, State Highway Engineer; B. A. McGinniss, Attorney; and Ella Creary Thompson, Secretary, were also in attendance.

The minutes of the first quarterly meeting were read and approved.

The minutes of the budget meeting were read and approved.

Chairman's Report

The report of the chairman was read, approved and ordered filed.

Project 37-D

Upon motion of Mr. Schilling, seconded by Capt. Hillman, the following resolution was adopted:

Resolved, That the bid of J. B. Southard, of Orlando, Florida, being the lowest received for the construction of the several bridges on Road No. 2, Paynes Prairie, Alachua County, the chairman be and he is hereby authorized to award a contract to Mr. Southard covering above work, known as Project 37-D, at the prices submitted in his bid for same.

Brevard County Power Company

Upon motion of Capt. Hillman a resolution was adopted instructing the chairman to notify Brevard County Power Company that the Department does not see fit to grant authority to said company to use the right of way on Road No. 4 in that county, between Bonaventure and Melbourne, for power lines nor to allow cross arms to overhang same.

Levy County—Road 19

Upon motion of Mr. Green, seconded by Mr. Corry, the following resolution was adopted:

Resolved, That the Board concurs in the opinion of the chairman that no money can be expended on Road No. 19, in Levy County, at this time.

Seminole County—Road No. 3

Upon motion of Mr. Corry, seconded by Mr. Schilling, the following resolution was adopted:

Resolved, That the Department hereby directs the State Highway Engineer to carry on the work of repairing Road No. 3, Seminole County, under the 1924 Maintenance Budget and that same be kept in repair.

Marion County—Road No. 2

Upon motion of Mr. Schilling, seconded by Mr. Green, a resolution was adopted authorizing the condemnation of certain lands for a right of way on road No. 2 in Marion County.

Volusia County—Road No. 4

Upon motion of Mr. Schilling, seconded by Mr. Green, a resolution was adopted authorizing the condemnation of certain lands for right of way purposes on Road No. 4 in Volusia County.

Palm Beach County—Road No. 4

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the State Highway Engineer is hereby directed to make certain surveys on Road No. 4 in Palm Beach County so as to secure the pro-

per location for a bridge across the Loxahatchee River at Jupiter.

Railroad Siding—Okeechobee Branch, Osceola County

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That in view of the high rate of rental as given by Mr. H. N. Rodenbaugh, general manager, the Department does not feel justified in retaining the Florida East Coast Railway Company siding at MP 66 plus 4255', known as Okeechobee Branch, in Osceola County.

Clay County—Road No. 3

Upon motion of Mr. Schilling, seconded by Mr. Corry, the following resolution was adopted:

Resolved, That the State Highway Engineer be hereby instructed to make a survey of Road No. 3 across Clay County as soon as convenient.

Nassau County—St. Marys River Bridge

Whereas, This Department has arranged with the Highway Commission of Georgia for the construction of a bridge across the Saint Marys River at a point on State Road No. 3 at or near Wilds Landing in Nassau County; and,

Whereas, This river forms the boundary line between the States of Georgia and Florida, and it is therefore necessary that Congress pass an act authorizing the construction of such a bridge; and,

Whereas, Such an act has been introduced in the House of Representatives and in the Senate; and,

Whereas, This bridge will be on one of the interstate roads which has been designated a primary road on the Federal system of roads in Florida; and,

Whereas, The construction of such bridge is a matter of great interest to the people of this State, and there is a great need that the Act now pending in the House be passed before the adjournment of the present session of Congress; therefore, be it,

Resolved, That this Department desires to express its appreciation of the efforts of our senators and members of the House of Representatives in attempting to bring about the passage of such act of Congress, and we do earnestly urge that they continue their efforts to the end that such act may pass the House and become a law before the adjournment of the present session of Congress.

Be it further resolved, That the secretary of this Department furnish a copy of this resolution to the Highway Commission of Georgia and to each of our members of the Senate and House of Representatives.

Upon motion of Mr. Schilling, seconded by Mr. Green, the foregoing resolution was unanimously adopted.

St. Lucie County

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the matter of allocation of \$115,000 to St. Lucie County be referred to the attorney for the Department for his opinion as to the legality of such appropriation.

Road No. 2—Columbia and Hamilton Counties

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, The chairman be and he is hereby instructed to advertise for bids for hard-surfacing Road No. 2, from Lake City to the Georgia line.

Highlands County

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby instructed to advertise for bids for the construction of certain sections of Road No. 8 in Highlands County, in accordance with recommendations made by the State Highway Engineer; the advertisement to specify that the work on this road shall be completed by December 1st, 1924.

Kissimmee River Bridge—Road No. 8

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the chairman be and he is hereby instructed to advertise for bids for the construction of a bridge over the Kissimmee River on Road No. 8; bids to be taken on creosoted and untreated timber for the approaches, and the advertisement to specify that work on this bridge shall be completed by January 1st, 1925.

St. Johns and Flagler Counties—Road No. 4

Upon motion of Mr. Schilling, seconded by Capt. Hillman, the following resolution was adopted:

Whereas, The Department realizes the manifest importance of that portion of State Road No. 4, running through St. Johns and Flagler Counties; and,

Whereas, The forces and equipment of the State Road Department are now engaged in the completion of projects started last year; therefore, be it

Resolved, That it is the sense of this Department that it is its intention and purpose to reconstruct said portion of said State Road No. 4 at the earliest practicable moment.

Madison County

Attorney Charles E. Davis, of Madison, appeared before the Department representing the county commissioners of Madison County, and proposed that the county commissioners turn over to the Department the proceeds of the sale of \$77,000 of Madison County, five per cent bonds, to be used by the Department to aid in the construction and hard surfacing of Road No. 9, between Madison and the Georgia State line, said proceeds to be applied at a rate not to exceed seven thousand (\$7,000) dollars per mile, and the State to undertake the construction of said road.

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Whereas, Bonds of Madison County in the amount of \$77,000 have been duly authorized to be issued for the purpose of constructing a paved, macadamized or other hard-surfaced highway in said county between the points hereinafter set out; and,

Whereas, It is desired by the Board of County Commissioners of said Madison County, to transfer to this Department the proceeds of the sale of said bonds to aid in the construction of said road, under the provisions of Chapter 8553, of the laws of Florida of 1921; and,

Whereas, This Department is willing to accept the proceeds of said bonds under the conditions specified in said chapter, and to construct the said road when and if the proceeds of said bonds shall be turned over to the Department; now, therefore, be it

Resolved, That the Chairman be and he is hereby authorized for and on behalf of the State Road Department to enter into a contract with the Board of County Commissioners of Madison County, Florida, to construct a paved or hard-surfaced highway from a point in the Town of Madison on the highway running from the bridge across the Suwannee River near Ellaville to the bridge across the Aucilla River, on the Greenville-Monticello public road to the line between the states of Florida and Georgia where it crosses the now established public road from Madison, Florida, to Quitman, Georgia, and the bridges and culverts incidental thereto in said county; and will pave or hard surface same by providing an 8-inch compacted rock base, 16 ft. wide, and will protect same with surface treatment, and maintain same until a permanent wearing surface can be placed thereon, according to the standard specifications of the State Road Department; with the proviso that the work of putting down the rock base and surface treatment shall be commenced as soon as the road bed is completed, and pushed continuously to completion; and with the further proviso that the permanent wearing surface shall be completed by December 31st, 1927.

The Chairman is also authorized to take over from the County of Madison for the building of said road the proceeds arising from the sale of \$77,000 of Madison County five per cent road bonds, issued for the purpose of building said road, and to contain such other provisions as the Act of the Legislature, Chapter 8553, provides for or may contemplate.

Jackson County

The Chairman read a communication from the Jackson County Chamber of Commerce making certain requests for aid in that county, and upon motion of Capt. Hillman, seconded by Mr. Green, a resolution was adopted directing the Chairman to handle this matter and make such reply to the Chamber of Commerce at Marianna as he deemed advisable.

Putnam County

Upon motion of Mr. Schilling, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the Chairman be and he is hereby authorized to enter into a contract with Putnam County for the construction of a hard surface on Road No. 3 from Dunn's Creek to San Mateo, and from Rice Creek to the Clay County line;

Also for hard surfacing Road No. 14 from Palatka to the Alachua County line;

Provided, District No. 6, Putnam County, will turn over to the State Road Department funds to aid in this construction at the rate of \$15,000 per mile; and,

Provided further, That after investigation by the Chairman and Attorney for the Department, it is ascertained that this Department can legally enter into such contract with said District No. 6, Putnam County.

Holmes County—Road No. 1

A delegation from Holmes County and the Town of Bonifay came before the Department regarding the location of Road No. 1 through that county and the Town of Bonifay.

Upon motion of Mr. Corry, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the State Highway Engineer is hereby directed to make a survey of Road No. 1 through Holmes County as soon as possible and as far as practicable to comply with the request of the citizens of Bonifay.

Taylor County—Road No. 19

Upon motion of Capt. Hillman, seconded by Mr. Green, the following resolution was adopted:

Resolved, That the State Road Department does hereby appropriate \$40,000 to be used on Road No. 19, Taylor County, this being a continuation of work under a former appropriation to old Road 108; this amount to be paid February 20, 1925.

Polk County

The matter of location of that portion of Road No. 2 from Foxtown, north, to Polk City, was brought to the attention of the Department by Mr. Green and the State Highway Engineer is hereby instructed to go over the situation as soon as possible and submit a report on a location for said road and same will be considered for final action.

Escambia County

Upon motion of Mr. Schilling, seconded by Mr. Corry, a resolution was adopted approving the location of a certain portion of the Pensacola-Flomaton road in Escambia County.

Sumter County

A resolution was presented from the Board of County Commissioners of Sumter County, regarding taking over Road 23 in that county for maintenance by the State Road Department.

Judge Meginniss, Attorney for the Department, was asked for a written opinion regarding this matter, and a copy of same directed to be sent to the County Commissioners of that county.

Convict Camps

Upon motion of Mr. Corry, seconded by Capt. Hillman, the following resolution was adopted:

Resolved, That the Chairman is hereby authorized to have the camps now located in Marion, Nassau and Columbia counties placed on Road No. 1 between the Chattahoochee river and Monticello, as soon as the work they are now engaged in is completed.

Budget—1924

Upon motion of Capt. Hillman, seconded by Mr. Corry, the following resolution was adopted:

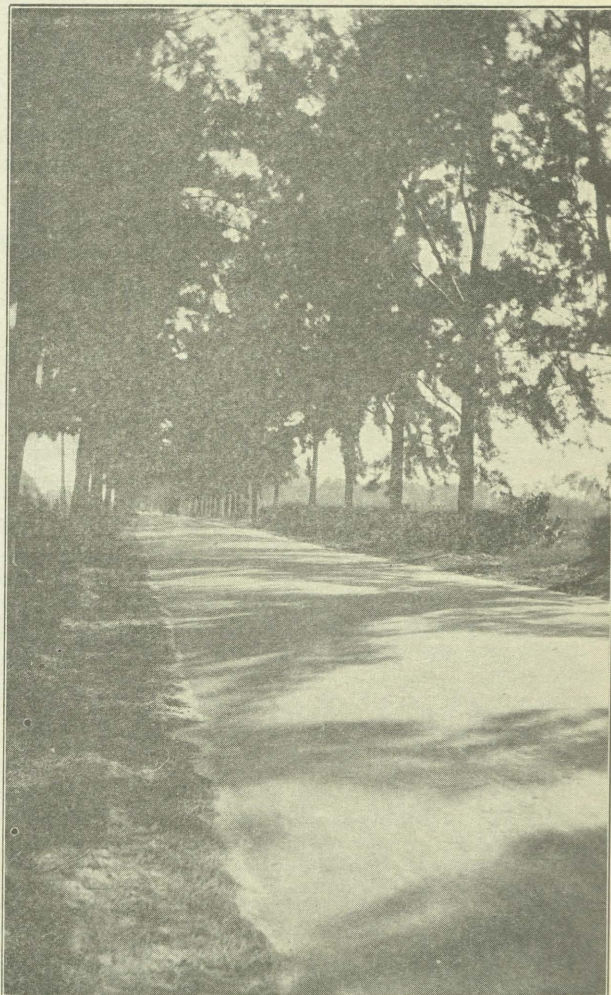
Resolved, That the tentative bulget for 1924 as previously submitted be and is hereby adopted as the permanent budget of this Department for 1924; with the following additions: Project 564-A, Road 5, Charlotte County, Punta Gorda, north; Road No. 10, Leon County, Tallahassee to the Georgia line; Road No. 35, Madison County, Greenville to the Taylor County line; bridge over Loxahatchee river

at Jupiter, Palm Beach County, Road No. 4; maintain Road 2 and build shoulders from Plymouth, south, to Lockhart.

Expense Account

Upon motion duly carried, the expense accounts of the members are authorized to be paid.

There being no further business the Department adjourned.

**A CORRECTION**

The above photograph which we consider on of the most beautiful which has ever appeared in these pages, was published in last month's issue, and through an unfortunate error the legend stated that the road was in Brevard County. There are, of course, some beautiful road scenes along road No. 4 in Brevard County, as the same winds along the Indian River which probably equal in beauty the prospect here shown.

As a matter of fact, however, this particular road is in Broward County and the same was published to draw attention to the excellent work which that county has done and is doing in road construction. The road in question was built by Broward County and the photograph shows for itself that there is no more beautiful stretch of Florida scenery in all the State.

This correction is made with apologies for the unfortunate error.

Construction and Maintenance of Sand-Clay and Top-Soil Roads

By W. R. NEEL, State Highway Engineer of Georgia

It is really surprising how successfully a road properly constructed of carefully selected sand clays or top soils, when intelligently maintained, can care for a large volume of traffic, and what a complete failure a road of this type can be when no care is exercised in the selection of these materials and in their mode of construction.

A concrete pavement is a failure when inferior aggregates are used, when the cement is damaged in handling, when specification requirements as to time of mixing, amount of water, proportioning of materials, etc., are disregarded. Even though all of these errors have been carefully avoided, should the surface be roughly finished or the pavement improperly cured, the construction will be pronounced a failure.

All of us realize fully how important it is to follow carefully the specifications and plans in the construction of a reinforced concrete bridge. We also realize the necessity of following carefully the specifications and plans in the construction of any hard-surfaced road, not only on account of the first cost involved but because we realize that any omission or deviation will probably result in a complete failure and certainly in an inferior job.

One of the objects to be sought after in the selection of top-soil or sand-clay surfacing materials is to secure a proper grading of the small aggregates making up this material, in order to have a dense mass. There must also be a liberal amount of coarse material above a No. 60 sieve.

It is essential that the binder be of good quality and in just the right amount to fill the voids. Too much clay binder will result in a bad, muddy or slippery road in wet weather; too little will result in a very dusty road in dry weather.

Top-soils materials when taken from shaded, uncultivated places generally make a better road surface than similar material taken from a cultivated field. This is due to the presence of organic matter. Top-soil materials are lacking in uniformity. From one field a variety of materials may be obtained. Because of this fact and the change in the proportion of coarse material and clay as greater depth is reached in excavating for sand-clay, the most important construction feature to be observed after a suitable material has been found is to thoroughly mix these materials when placed upon the road, by the use of a harrow and scarifier or plow, in order to secure a uniformity of composition. It is also essential that a continuous machining of the material be followed during and after construction until the surface has set, to secure a smooth riding surface.

These surfacing materials are to be classed as mixtures of loose aggregates wherein the larger sizes and particles (sand and gravel) have a stability due chiefly to mechanical interlocking or bond, and wherein the finer particles (silt and clay) increase

that mechanical stability by filling voids and by greater or less adhesion, usually with the aid of moisture, to the larger particles.

The adhesion of the silt and clay to other aggregates and their own internal cohesion are due in part to the nature of the silt and clay, but are also largely influenced by the amount of moisture present.

The resultant strength of these materials under traffic is dependent upon mass action. The slabs must have adequate thickness and monolithic consolidation. Packed in thin layers—weakness and early raveling may be expected. Mass action in such slabs takes advantage of

- (a) Internal arching of the materials.
- (b) Resistance to direct compression.
- (c) Resistance to internal shears.
- (d) Resistance to diagonal tension when the silt and clay are adhesive.

Full bearing and impact resistances are not developed near the edges of the uncurbed slabs. Weakness may be expected for a distance about twice the thickness of the slab from the outside edges if unsupported. Usually these materials are deposited in trenches with supporting shoulders.

CLASSIFICATION OF SOIL MORTARS.

	Class A Per Cent.	Class B Per Cent.	Class C Per Cent.
Clay	9 to 18	15 to 25	10 to 25
Silt	0 to 15	10 to 20	10 to 20
Total sand	65 to 80	60 to 70	55 to 80
Sand above No. 60 sieve.	45 to 60	30 to 45	20 to 30
	Hard	Medium	Soft

The detailed classification, percentage limits, and methods of laboratory analysis and tests are to be found in U. S. Department of Agriculture Bulletin No. 559, issued by the Bureau of Public Roads, and University of Georgia Bulletin Vol. XXII No. 5a. of June, 1922.

Coarse material above No. 10 sieve has a decided influence on the durability, hardness and smoothness of the surface. Ten per cent of such hard, gravelly material with a class B soil mortar justifies reporting the whole as a class A material.

Extensive experience in the field and in the laboratory support the following comments:

I.—As to soils having no coarse material above No. 10 sieve:

(a) Classes A and B give respectively admirable and adequate traffic service for the expense involved. It is doubtful whether Class C soil mortars should be used except on secondary roads with very light traffic and when the material is close at hand.

(b) The most important factor is the presence of coarse sand in liberal amount. There are, of course, marked differences in the clays and silts, but roads built of many different clays have shown excellent durability. It will be

(Continued on Page 19)

Status of Road Construction

DATE MARCH 1924

No.	Contractor.	Road No.	County.	Total Length Miles	Clearing Miles	Grading Miles	Base Miles	Surface Miles	Type	Per Cent. Complete.
18	Morgan-Hill Paving Co.	3	Putnam	12.8	12.8	12.64	12.8	12.8	B.M.	99.0
27-A	C. F. Lytle	2	Columbia	5.67	5.67	5.60	.....	5.67	C.	99.9
27-B	C. F. Lytle	2	Columbia	6.68	6.68	6.34	.....	6.41	C.	95.0
32	State Forces	4	Nassau	10.00	10.00	10.00	10.00	7.8	B.M.	90.7
34	Union Indemnity Co.	7	Escambia	10.0	10.0	7.70	.....	5.5	C.	58.7
35	Hancock Brothers	1	Escambia	5.0	5.0	4.99	.....	5.00	C.	99.9
36-A	H. L. Clark & Sons	4	St. Lucie	7.76	7.37	7.37	6.98	3.10	B.M.	69.5
36-B	C. F. Lytle	4	St. Lucie	7.12	6.30	3.91	0.00	0.00	C.	10.41
37-A	F. W. Long & Co.	2	Alachua	.70	.14	.10	0.00	0.00	S.A.	8.00
37-C	F. W. Long & Co.	2	Alachua	3.26	3.09	2.93	0.00	0.00	S.A.	26.00
37-D	Fla. Drain. & Const. Co.	2	Alachua	2.14	0.00	0.00	.....	.....	G.	0.00
37-E	Wm. P. McDonald Const. Co.	2	Alachua	7.96	7.64	6.76	3.58	0.00	S.A.	36.3
40-A	C. F. Lytle	4	Brevard	16.17	3.23	0.00	0.00	.....	R.	1.5
40-D	J. Y. Wilson	4	Brevard	6.72	2.01	0.33	0.00	.....	R.	1.43
40-E	Langston Constr. Co.	4	Brevard	13.60	2.72	0.95	0.00	.....	R.	1.5
501	State Forces	6	Calhoun	41.19	41.19	39.94	.....	35.01	S.C.	96.0
503	State Forces	2	Charlotte	20.18	20.18	19.17	.....	18.16	S.C.	93.0
505	State Forces	2	Columbia	11.8	11.80	11.80	10.03	.....	R.	81.0
507	The Barber-Fortin Co.	4	Flagler-Volusia	10.0	10.00	10.00	8.50	.....	R.	75.0
515	State Forces	20	Jackson	16.6	16.60	16.60	.....	16.60	S.C.	100.0
519	State Forces	5	Manatee	3.5	3.50	2.62	2.10	0.00	B.M.	52.0
521	Morgan-Hill Paving Co.	4	Nassau	12.41	1.86	0.37	0.00	.....	R.	.003
523	M. J. Cole (Co. Funds)	8	Okeechobee	8.75	8.75	5.25	5.68	0.00	B.M.	66.9
532	State Forces	3	Volusia	18.9	18.90	18.90	18.90	11.34	B.M.	85.0
534-A	J. D. Donahoo & Sons	24	Brevard	2.65	2.65	0.95	0.00	.....	R.	36.0
534-B	Noll & Noll	24	Brevard	11.85	11.85	11.85	6.04	.....	R.	51.0
536	County Forces	1	Gadsden	5.5	5.50	5.50	.....	4.95	S.C.	98.0
538	State Forces	2	Marion	10.92	10.92	10.92	10.92	.....	R.	75.0
539	County Forces	5	Marion	11.3	11.30	10.30	2.37	.....	R.	25.83
544-A	F. S. Whitney	5	Pasco	8.75	8.75	0.43	0.87	.....	R.	12.9
544-B	The Barber-Fortin Co.	5	Pasco	11.33	5.44	3.17	0.00	.....	R.	9.81
545	Broadbent & Groeting	5	Hernando	9.51	9.51	7.13	1.71	.....	R.	23.2
553	State Forces	2	Marion	9.15	8.60	7.32	1.29	.....	R.	22.8
554	The Barber-Fortin Co.	4	Brevard	5.0	5.00	5.00	4.98	.....	R.	99.0
560	State Forces	6	Calhoun	20.0	16.0	13.00	.....	14.00	S.C.	64.0
562-A	Southern Surety Co.	8	Highlands	5.37	5.37	5.37	.....	.....	G.	100.0
562-B	W. P. Kennedy Const. Co.	8	Highlands	10.71	10.71	10.71	10.17	3.21	S.A.	67.0
564-A	Edgar Chapman (Co. Funds)	5	Charlotte	10.88	2.06	1.63	0.00	0.00	G.	10.0
564-B	Boone & Wester	5	Charlotte	10.31	10.31	8.91	0.00	0.00	G.	95.0
565	State Forces	1	Madison	15.64	13.29	9.30	.....	0.00	S.C.	65.0
570	Morgan-Hill Paving Co.	5	Manatee	3.96	3.96	3.96	3.96	1.58	B.M.	75.4
571	Hunter and Gladwell	1	Madison	14.73	2.35	2.65	.....	0.00	S.C.	17.0
572	L. M. Gray	13	Bradford	7.3	7.30	7.30	2.55	.....	R.	30.0
574	State Forces	9	Madison	11.66	6.99	4.31	.....	0.00	S.C.	33.5
575	State Forces	3	Putnam	5.46	5.18	4.20	1.09	.....	R.	40.7
576	S. T. Buchanan & Son	5	Sarasota	5.68	0.00	0.00	.....	.....	G.	0.00
577	County Forces	19	Taylor	9.732	9.73	9.73	9.73	.....	R.	100.0
579	State Forces	1	Holmes	8.62	5.60	5.60	.....	5.60	S.C.	62.0
584	Noll & Noll	24	Osceola	2.00	2.00	1.98	.....	2.00	Brick	98.0
586	State Forces	1	Jackson-Wash'ton	17.37	1.73	1.73	.....	0.34	S.C.	30.0
589	County Forces	5	Lee	8.27	8.27	8.27	7.45	.....	R.	90.1
594	State Forces	13	Bradford	9.095	9.09	8.64	.....	.....	G.	96.5
594	L. M. Gray	13	Bradford	9.095	.....	.....	0.27	.....	R.	3.0
597	J. Y. Wilson	4	Volusia	16.24	3.73	2.11	0.00	.....	R.	3.19
598-A	W. J. Bryson Paving Co.	1	Jefferson	9.45	3.15	1.89	.....	0.00	S.C.	26.0
599	M. M. Boyd	2	DeSoto-Charlotte	7.1	7.10	3.19	.....	.....	G.	20.0
604	C. F. Lytle	4	Volusia	7.72	0.07	0.00	0.00	0.00	R.	.002
607	State Forces	13	Bradford	5.10	5.10	2.55	.....	.....	G.	66.0
607	L. M. Gray	13	Bradford	5.10	.....	.....	0.00	.....	R.	0.00
608	State Forces	4	Brevard	9.29	5.75	1.20	0.00	.....	R.	2.15
Totals					439.79	375.07	141.97	159.07		

TOTAL MILES COMPLETE.

	Clearing Miles	Grading Miles	Base Miles	Surface Miles
Total March 31, 1924	992.87	928.15	300.40	551.60
Completed Feb. 29, 1924	Concrete 72.82	Brick 25.12	S. Asphalt 61.07	Bit. Mac. 120.63
Completed March 31 1924	3.07	0.00	2.18	3.46
Total March 31, 1924	75.89	25.12	63.25	124.09
			75.39	303.08
			196.19	863.01

Note—The above tabulation shows only those projects that are actually under construction at the present time and does not show projects that have been previously completed. However, the table, "Total miles completed," at the foot includes all projects that have been completed prior to March 31st, 1924, and the amount completed in March also. The abbreviations used are as follows:

C—Concrete. S.A.—Sheet asphalt. B.M.—Bituminous macadam. R.—Rock base. S.C.—Sand clay. G.&D.—Graded and drained.

CONSTRUCTION AND MAINTENANCE OF SAND-CLAY AND TOP-SOIL ROADS

(Continued from Page 17)

noted that the total clay present in the best samples rarely exceeds 18 per cent. Efforts are being made, however, to differentiate between clays by laboratory tests, and some tentative progress has been made.

(c) It may be accepted that the sand below No. 60 sieve has little supporting value. It has some value in filling voids when coarser sand is present.

(d) Highly organic silts have binding value and strengthen the mixture so long as the organic matter persists, but such silts lose the organic matter quite rapidly by decay and dusting.

(e) The more adhesive or highly colloidal clays give effective bond with as little as 9 per cent present. Less plastic clays are needed in larger amount up to a maximum of 25 per cent, but the mixtures with 20 to 25 per cent clay are apt to be slippery and cut into mud in long spells of wet weather.

(f) Laboratory tests indicate that the adhesive values of clays are largely dependent upon the colloidal state of the material and the moisture present. Metal plates cemented together with thin films of clay show markedly greater adhesion when containing 5 to 10 per cent of water than when dried at 212 degrees.

(g) In general, it is believed that inorganic silts tend to diminish the strength of road soils, and noticeably so when present above 15 to 20 per cent in the soil mortar.

II.—As to soils containing 10 per cent or more of hard, coarse material above No. 10 sieve:

(a) It is a matter of assured experience that such coarse material adds greatly to the durability of the mixtures. Such soils are found in many places and give rise to a series of semi-gravels reaching from 10 per cent up to the 50 or 60 per cent in a full gravel road.

(b) A good class A soil mortar with from 20 to 30 per cent coarse material gives a fine surface of marked durability. This is especially true of the iron-silica gravels in southwest Georgia with from 25 to 40 per cent of a nodular iron-impregnated gravel, ranging from 1 inch downward. These nodules are not nearly so hard as true silica gravel, but are sufficiently strong to give most excellent service and very smooth travel.

The Effect of Wet Weather

(a) Moderate ground moisture increases the strength of all classes of these roads.

(b) Long and heavy rains influence them as follows:

Class C.—Softens the surface so that wheel ruts 2 or more inches deep may appear under heavy vehicles, and when the sand is fine, considerable material is washed down the steeper grades and into the side ditches. They do not show deep mud and are not slippery. Repairs are readily made with drags and road machines.

Class B.—Softens only after very long and continued wet weather; wheel ruts rarely as deep as 2 inches; not much washing into side ditches. Easily repaired with road machines. Dry out promptly and are usually too hard for any but the heaviest metal drags and light road machines.

Class A.—Do not materially soften except where water stands for a long time in depressions. Wheel ruts rarely deeper than 1 inch. The slab below this surface mud is generally hard and firm and will require the heaviest road machines to reshape the surface. Dries off rapidly and soon becomes too hard for the heaviest road machines to cut.

(c) Laboratory tests show that these road soils are of marked density, are not readily penetrated by rain on the surface, and when made into briquettes with varying amounts of water they retain the larger part of their tenacity until 15 to 25 per cent of water is added.

Thickness and crown:

The thickness used is designed to supply mass action and to provide ample shearing resistance against traffic pressures and impacts.

The usual specification has been 10 inches when packed in place. On weak subgrades, especially those subject to ground water saturation or capillary lift from below, this should be increased to 12 or 14 inches.

Exceeding the above depths, the following is the result:

(1) Examination of the packed road slab shows that the

hard pack rarely extends more than 6 inches deep. The material below this, while firm, is easily penetrated by a pick and comes up in small pieces rather than as a large clod.

(2) The lower portion is thus functioning less actively in bearing resistance, but most probably it serves usefully as a drainage layer and also as a cut-off plane against capillary lift of water from the subgrade. The added thickness also prevents cutting into the subgrade in scarifying and heavy machining when under maintenance. The life of the surface is materially prolonged.

As to the proper crown, the earlier view advocated a high crown, even as much as 1 inch per foot, but later experience has shown that $\frac{1}{4}$ -inch per foot is adequate and much more acceptable to the traffic. This low crown can only be used when under continuous maintenance.

Most Roads Will Have Low Type of Construction for Many Years

I have endeavored to emphasize the fact that although a top-soil or sand-clay surfacing material is recognized as a very low type of construction, it is just as essential that proper materials and care be used in their case as in the construction of the higher types of hard surfaces.

The great majority of our roads will always be without a hard surface, therefore the study of the proper method of construction and selection of local materials is most important. Proper care will make their maintenance possible as well as economical. Carelessness and disregard of scientific principles will result in a complete failure when maintenance is undertaken.

Some engineers who are entirely unfamiliar with this material feel that a road surfaced in this way is little better than an unsurfaced dirt road. This is a mistaken idea. In truth, north Georgia travel after rains would be impossible on an unsurfaced road, whereas, by the application of the top-soil material an automobile without chains can safely and comfortably travel over any such surfaced road.

In south Georgia, where the nature of the soil is clay, a like condition exists unless the sand-clay surfacing material is applied. In the extreme southern portion where deep sand is to be found, it would be almost impossible to travel unless the sand-clay material was first applied to the surface. The great advantage in the use of this material is not only that it makes travel possible in bad weather, but that it costs very little more than common excavation.

Maintenance

With inadequate funds maintenance is a hopeless undertaking; therefore, the most important feature of successful maintenance is adequate financing.

The improvement of an entire system of highways either by maintenance or by construction attracts to these improved roads traffic from other roads and encourages and develops new traffic during winter months and rainy weather which, before the improvements were made, never existed; passenger bus lines, freight hauled by motor trucks, new sawmills and various other industries dependent upon good roads spring up.

The lack of good roads, the innumerable number of

"road terrors," such as bog holes, rotten bridges, etc., have discouraged the use of our roads in bad weather, but the minute these weak links are removed the traffic multiplies—and always a class and weight of traffic in excess of the safe carrying capacity of the temporarily surfaced road.

The large mileage of sand-clay and top-soiled roads constructed in Georgia, together with the work done by the maintenance organization, have made possible continuous use of the roads the entire year. This has put the roads to a severe test, and I am convinced that unless the heaviest traveled roads are paved within the next few years they will rapidly deteriorate and again become unserviceable at certain seasons of the year.

It is impossible to devise an ideal maintenance scheme which will be suitable for each state. The equipment and organization must be selected after a careful study of the roads to be maintained. We have in Georgia eleven divisions, and the equipment and organization vary somewhat in each of them.

The maintenance of dirt roads requires an intimate knowledge of the particular road to be maintained, the class of soil, what effect water has on it, and how rapidly the soil dries out after rains. Certain road soils should be machined only when absolutely necessary to remove deep ruts which cannot be removed with the road drag or float. Certain soils require very careful dragging with just the right amount of moisture content to form a hard crust, after the forming of which it is very important to use no machine or type of tractor that will break this crust.

It is very important that the maintenance man be familiar with the seasons in order to anticipate rains in doing certain kinds of work on the road surface in his charge. Frequently it becomes necessary to plow up the road in order to thoroughly remix the material in the road surface. If this is done at a time of year when continuous rains may be expected, the result will frequently be disastrous and even result in that particular section of road becoming impassable. Yet a certain amount of rainfall is required to aid in resetting the road surface material; otherwise, this newly plowed and harrowed section of road will become a dust bed, and a large amount of material which has been hauled on to the road will be lost by being carried away by the winds and traffic.

A maintenance man must be familiar with every hundred-foot section of the road under his charge. One part of the road which gets bad in wet weather may be remedied by the application of a few inches of coarse sand thoroughly cut into the surface; another section which gets soft and dusty in very dry weather may be improved by the addition of a good quality of clay.

On a long section of improved sand-clay or top-soiled roadway there are relatively few places that get bad in unfavorable weather. Careful study of each individual place by the patrolman and a simple remedy which can generally be easily and cheaply applied will result in the gradual improvement of a large mileage of highways, provided the traffic is not of such a nature or of such a volume that there is a general breaking down of the entire road surface when weather conditions are the slightest bit unfavorable. The only remedy for a condition of this

kind is to have at one's command sufficient funds to construct a surface adequate for the traffic.

After a top-soil or sand-clay road has been properly constructed, the ditches should only be machined when absolutely necessary to provide a suitable waterway, and great care should always be used to prevent the mixing of the ditch material with the road-surface material. A fringe of Bermuda grass growing on the shoulder of the road will aid in separating these materials.

Patrol Maintenance

One hundred patrol sections properly equipped are a sufficient number for a 5,000-mile system of roads. Forty additional outfits equipped for heavy work, such as reshaping, scarifying, cutting ditches, etc., are a sufficient number of this class of equipment for this system, and ten supervisors with one assistant each can lay out and direct the entire work.

The training of maintenance men is the biggest undertaking of all, and after the State has made the large investment in these men that is necessary before their work really becomes most effective, radical changes in the laws governing the highway department should not be made which would cause the adoption of different methods and the consequent loss of the money already invested in the education and training of these men.

There is no better way of determining *where* and *when* and *how* to improve the road than by a careful study of maintenance effort and cost.

A sand-clay road will adequately serve the traffic of certain districts; in others gravel is required; and there are still other roads for which it would be a waste of money to construct anything less than the highest type of pavement. This statement might not appeal to you so forcibly before the improvement is made as after it is made, when the inter-city traffic which might be almost negligible before the improvement has been made, will become very heavy. The rural or local traffic will also increase, not only because the road can be used more days of the year by those accustomed to use that particular road, but also because a great many will use the improved road because it is so much better than the other available roads.

In this case, unless the improvement is adequate for the traffic, not only will maintenance cost become prohibitive, but traffic will be seriously handicapped in its use, and at certain seasons of the year actually blocked, as earth roads with a certain volume of traffic cannot be maintained in a passable condition through rainy spells.

An Ideal Maintenance Organization for a 50-Mile Section

The following tables list the light equipment, labor, gas, oil and repair expenses for a 50-mile patrol section:

LIGHT EQUIPMENT.

2—Tractors	\$2,800.00
1—Truck	600.00
2—Road machines	1,200.00
1—Three-way drag	300.00
3—Small drags	40.00
Small tools	100.00

\$5,040.00 X 100 Sections

25 per cent depreciation.

HEAVY EQUIPMENT

1—Ten-ton tractor	\$ 6,000.00
1—Road machine	1,750.00
1—Road machine	1,200.00
1—Three-ton truck	2,400.00
1—Mowing machine	600.00

\$11,950.00 X 40 Sections

25 per cent depreciation.

FIFTY-MILE SECTION—LIGHT MAINTENANCE.

Equipment Valued at \$5,040.00.

	Per Month
Labor, equipment, gas, oil and repairs.....	\$ 495.00
25 per cent yearly depreciation.....	105.00
6 per cent interest on equipment investment.....	25.90

Total\$ 625.90

FIFTY-MILE SECTION—HEAVY MAINTENANCE.

Equipment Valued at \$11,950.00 for Use on 125-Mile Section.	
Labor, equipment, gas, oil and repairs.....	\$ 288.00
25 per cent yearly depreciation.....	99.58
6 per cent interest on equipment investment.....	23.90

Total\$ 411.48

OVERHEAD AND OFFICE EXPENSE.

General supervision, special supervision, mechanical labor, accounting, office overhead, supplies, etc.	\$ 117.00
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All expenses chargeable to fifty-mile section—

Total	\$1,154.38
For 1 mile.....	23.087
For 1 mile*.....	277.05

The above expense provides continuous work throughout the entire year.

FIFTY-MILE SECTION.

Labor, Equipment, Gas, Oil and Repairs.

1—Patrolman (foreman and tractor operator).....	\$ 100.00
1—Machine operator	60.00
7—Truck driver or tractor operator.....	50.00
3—Laborers	90.00
2—Tractors (Cetrac type) gas, oil and repairs....	100.00
1—One-ton truck (hauling laborers, tools and repair materials) gas, oil and repairs.....	50.00
2—8-foot road machines, repairs and replacing blades	10.00
3—Small drags, repairs and replacing blades.....	5.00
1—3-way drag or maintainer, repairs and replacing blades	20.00
Small tools, picks, shovels, pitchforks, mattocks, wheelbarrows, repairs and replacing same..	10.00
	\$ 495.00

Note: The above expense for light outfit.

ONE-HUNDRED TWENTY-FIVE-MILE SECTION.

Labor, Equipment, Gas, Oil and Repairs.

1—Tractor operator	\$ 100.00
2—Machine operators	120.00
1—Truck driver	50.00
2—Helpers	60.00
1—Ten-ton tractor—gas, oil and repairs.....	320.00
1—12-foot road machine with scarifier attachment.	
1—10-foot road machine—repairs and replacements	30.00
1—Three-ton truck—gas, oil and repairs.....	140.00
1—Mowing machine, repairs and replacements, small tools, picks, shovels, pitchforks, mattocks, wheelbarrows, repairs and replacing same	10.00
	\$ 720.00

Note: The above expense for heavy outfit working in addition to the small outfits. In the average state having 5,000 miles of roadway under maintenance 100 light outfits will be required working in conjunction with 40 heavy outfits.

*Per year.

This 50-mile section would be under the charge of a patrolman who would also operate either the tractor or the road machine. He would be assisted by a machine operator, a truck driver and three laborers. On a system of 5,000 miles of road there would be 100 such outfits.

In addition to the lightly equipped outfit, there would be an outfit equipped for heavy work. This outfit would cover 125 miles of road, passing from one 50-mile section to another and operating under the direction of the patrolman in the section in which the outfit is at work. There would be 40 such outfits in the above-mentioned 5,000-mile system.

In addition to the expense of the above-mentioned outfits, there would be the division overhead and office expense; the ten supervisors and the ten assistants, a division mechanic and helper, accounting, office supplies, etc., of each division; then there should be in each state a central shop equipped for the overhauling and heavy repair work necessary to the successful operation and maintenance of so large an amount of valuable equipment and machinery—amounting in all for the 5,000-mile system to a little less than one million dollars.

As shown by the detail tabulations, the sum of the operating cost, yearly depreciation cost on equipment, interest on both the light and heavy maintenance outfits, and the overhead and office expense, there is a total cost chargeable to every 50-mile section per month of \$1,154.38, amounting to a monthly charge of \$23.087 for each mile of road and a yearly charge of \$277.05 per mile.

This amount includes a yearly depreciation charge of 25 per cent and interest at 6 per cent on the equipment items. The interest charge should probably not be included. The supervisors of each division should report directly to the division maintenance engineers. There should be a chief maintenance engineer reporting directly to the State Highway Engineer, attached to the main office in order to co-ordinate the work in the various divisions.

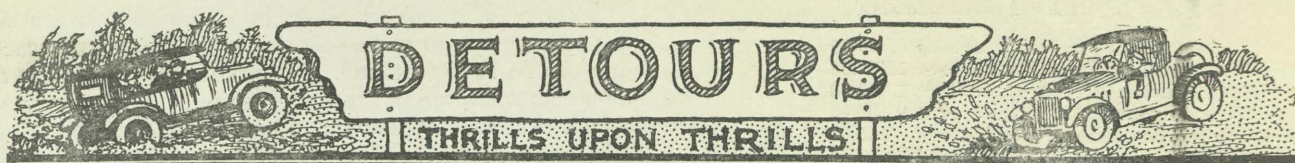
This, in my opinion, is a maximum outfit required to maintain the top-soil or earth roads on a 5,000-mile State system 365 days in the year; provided traffic is not too heavy, and provided the rainy spells are not of too long duration. Under these conditions an increase in maintenance expense would not materially improve matters. Earth roads will get wet, and when wet a sufficient amount of traffic will cut them up.

When to Drag

Experience on most roads in Georgia has shown that after a rain roads are in condition for dragging for not longer than two days following. With one dragging outfit on each section of the average length of 50 miles, it is possible to drag effectively, after each rain, one-third of the section. This requires three rains during the month to cover the entire section one time, or six different rains to cover it twice during any one month, the minimum number of draggings necessary to keep any of our dirt roads in fair condition.

With two outfits it is possible to drag an entire section after each rain if a suitable truck is used to drag, in addition to the tractor. In this way, by hav-

(Continued on Page 23)



Climbing Crocodiles

"Your Honor, I was not intoxicated."

"But the officer says you were trying to drive your car up a lamp post."

"I was, Your Honor. A couple of crocodiles had been following me around and I don't mind telling you how they were getting on my nerves."—Motor Age.

"The bad curve in the road east of town has been straightened out, I see."

"Yes, it was cheaper to do that than to build a hospital."—Exchange.

Pending the elimination of grade crossings, the locomotive designers might at least replace the antiquated cow-catcher with some sort of automobile mit.—Boston Herald.

Friendly Tip

If you want to go anywhere and be sure of coming back,

Stop, Look and Listen:

The wisest rule to follow when you see a railway track is

Stop, Look and Listen:

The time you lose in stopping and looking close and sharp

Might better be spent that way, than playing on a harp.

A lot of them have tried the game of beating out the train

A lot have tried it once, and never tried again, Don't "step on her," and maybe land inside the gates that glisten:

You will linger longer here below if you

Stop, Look and Listen.

—Miami Motorist.

Tests That Tell

Hi—"Gee, girlie, but she's a beaut," enthusiastically pointing to his new car.

Girl—"Why do you allude to the car as a 'she,' Hi?"

Hi—"Because it has beautiful curves, is not altogether trustworthy, and keeps its owner broke."—Green Gander.

A Fable

Once upon a time a tourist, passing through a strange country, stopped and asked a native for directions for reaching the next town by the most direct route.

The native gave him the correct information.—Maine Motorist.

Why Not Now?

"Eventually," moaned the Sad-Faced Man after he had vainly driven around the square 18 times, "eventually the suburbs will come to be known as the place where a guy has to park his car while he transacts some business in the city."—Motor News.

Speedy

An old Negro who was with the army in France was beating it for the back areas as fast as he could go when he was stopped by a white officer.

"Don't delay me, suh," said the Negro. "I's gotta be on my way."

"Boy," replied the officer, "do you know who I am? I'm a general."

"Go on, white man, you ain't no general."

"I certainly am," insisted the officer, angrily.

"Lordy!" exclaimed the Negro, taking a second look. "You sure is! I musta been travelin' some, 'cause I didn't think I'd got back that far yit."

Endowment

It was at a fashionable wedding. The bridegroom had no visible means of support save his father, who was rich.

When he came to the stage of the service where he had to repeat, "With all my worldly goods I thee endow," his father said, in a whisper that could be heard all over the church:

"Heavens! There goes his bicycle!"

Locomotives usually win in butting contests against motor trucks or passenger automobiles.

Fifty-Fifty

Nature keeps things balanced. Europe has the most wars, but we have nine times as many automobiles.—Trinidad Picketwire.

A Perfect Way

When you come to the end of a good detour,

And you sit and look at the sign,

And the arrows point in another way—

To the road you left behind;

Oh this is the end of a "perfect day"

And the end of your patience, too,

As you voice your thoughts in a quiet way,

And the air around gets blue.

—Illinois Motorist.

Nobody Home

"Where is the car?" demanded Mrs. Diggs.

"Dear me!" ejaculated Professor. "Did I take the car out?"

"You certainly did. You drove it to town."

"How odd! I remember now that after I got out I turned around to thank the gentleman who gave me the lift and wondered where he had gone."—American Legion Weekly.

Concerning Mr. Klegg

A lucky guy

Was old man Klegg.

Who had an ar-

Tificial leg.

For when that limb

Was smashed for fair,

He simply bought

Another spare.—Exchange.

**CONSTRUCTION AND MAINTENANCE OF SAND-CLAY
AND TOP-SOIL ROADS**

(Continued from Page 21)

ing a truck suitable for dragging purposes on each 50-mile section in addition to one tractor, it will only require two rains per month to keep the roads in reasonably good condition. Thus, it is seen to what a great extent the maintenance of dirt roads must depend upon the elements. By reducing the number of days the equipment and men are used in dragging, a greater number of days remain for hauling suitable repair material, reshaping ditches, opening up water-days, etc.

As shown in the equipment list, each light outfit has a 1-ton truck not only for hauling the material for patching road surface but also for the rapid transportation of the men to and from work.

I am indebted for a great deal of the information contained in this paper to Dr. C. M. Strahn, dean of engineering of the University of Georgia, who was probably the first engineer to begin to make a scientific study of top soils for surfacing materials, and who is a recognized authority.—The American City Magazine.

ANOTHER SIDE OF THE DETOUR PROPOSITION

(Continued from Page Three)

result the going was about as rough as can be imagined. On an inspection visit he came upon two ladies who lived in that vicinity and who were going in his direction. He invited them to ride with him, and remarked that the detour in question must be pretty hard upon those living in the vicinity, confidently expecting the usual complaint to follow.

To his surprise and gratification, one of the ladies smiled and said: "We don't think so much about how bad it is now—we are thinking of how good it WILL be when the road is finished."

We believe it is the best and fairest expression on the subject of detours we ever heard.

HIGHWAY BEAUTIFICATION

(Continued from Page 9)

was evidenced in many ways but perhaps in none better than by the fact that there were five invitations from cities wishing the fall convention. The convention voted to accept the invitation of Tampa and express its appreciation to Bradentown, Winter Haven, Ormond Beach, Seabreeze and Zephyrhills for their invitations. Wednesday was devoted to a motorecade through the famous Scenic Highlands, conducted by the Davenport Board of Trade and Haines City Chamber of Commerce.—Tampa Tribune.

Banking is perhaps as accurate an index of community development under our modern conditions as is any other, and therefore it was interesting to learn that the banking resources of Florida have increased more than fourfold during the last ten years. In view of this increase and in recognition of it, as well as for the purpose of meeting in one of the world's most happy and progressive communities, there is a movement on foot to hold the 1925 meeting of the national executive council of the American Bankers' Association at Miami.

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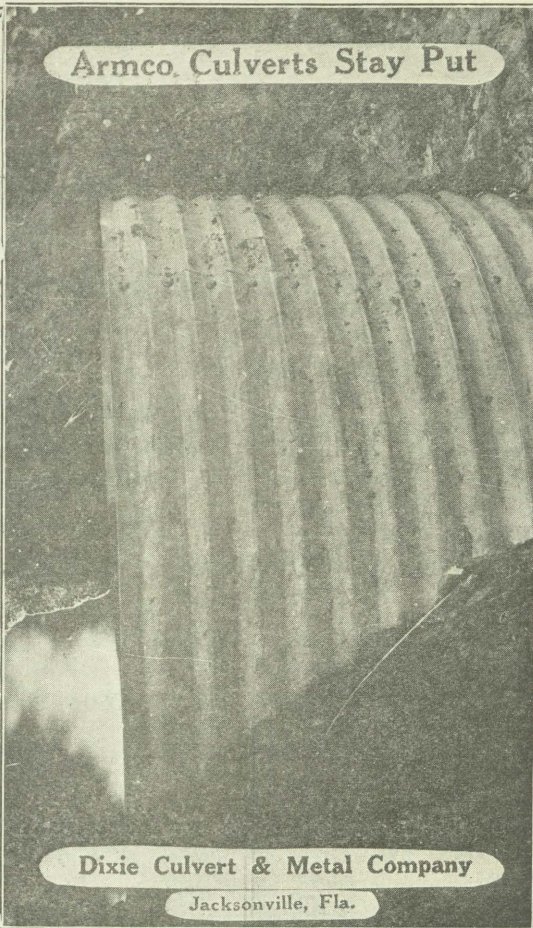
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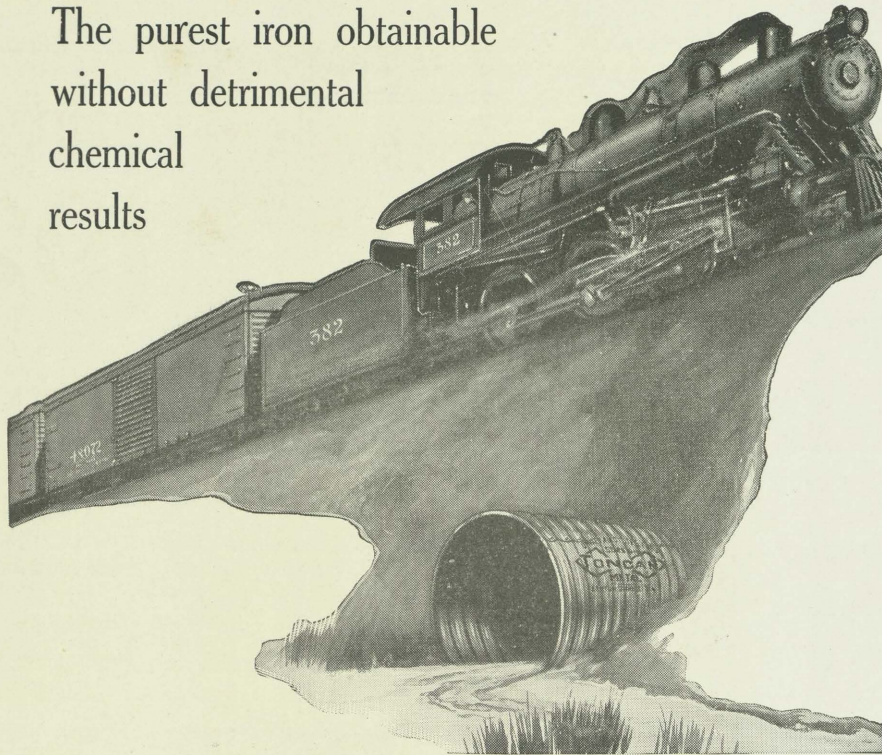
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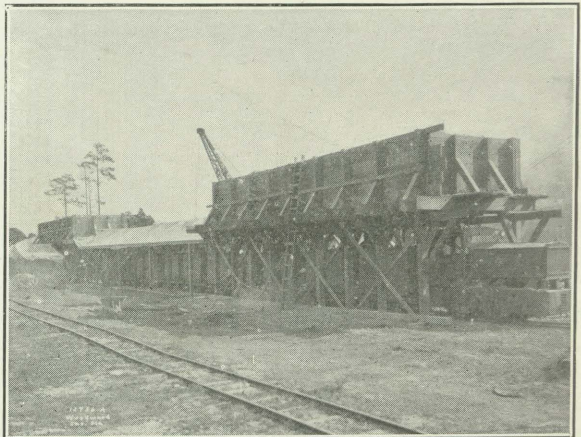
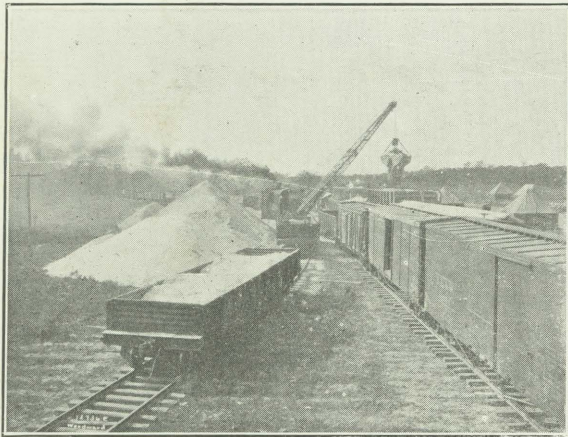
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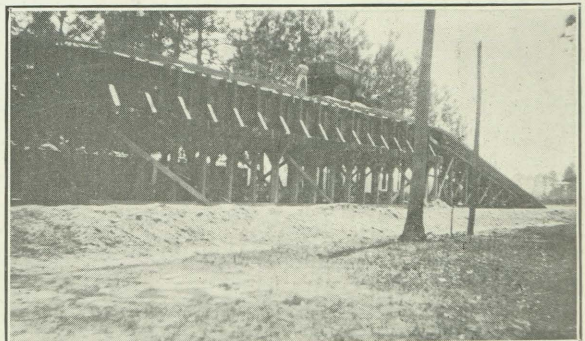
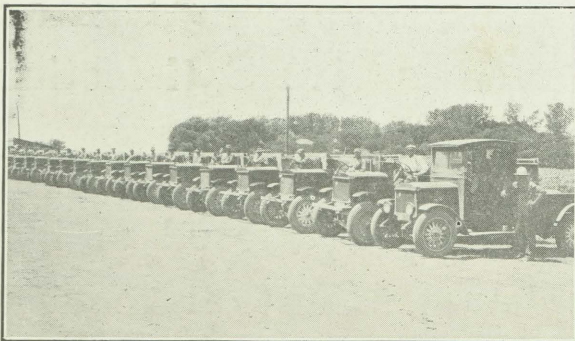
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